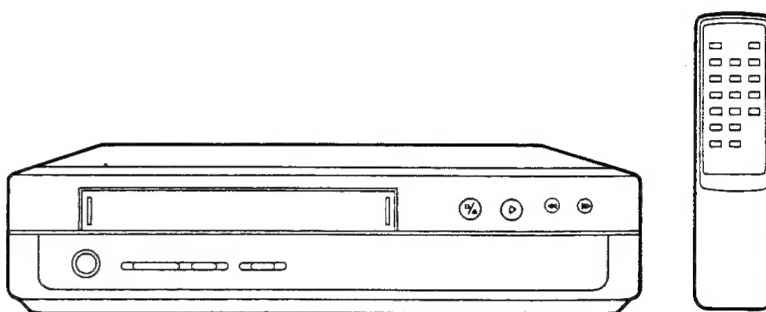


TOSHIBA

COLOR VIDEO CASSETTE RECORDER

V-203CZ, V-203CZE, V-303CZ



V-203CZ

SPECIFICATIONS

GENERAL

Video recording system: Head configuration 2-head rotary
Video signal: CCIR standard, PAL color
Storage temperature: -20° to $+60^{\circ}\text{C}$ (-4° to $+140^{\circ}\text{F}$)
Operating temperature: 5° to 40°C (41° to 104°F)
Antenna: 75-ohms external aerial terminal for UHF

Channel coverage:

	PAL B/G, SECAM B/G	SECAM D K	PAL D
VHF	E2 - E12	R1 - R12	C1 - C12
UHF	E21 - E69	E21 - E69	C13 - C57
CATV	X - Z + 2, S1 - S20		

AERIAL output signal: UHF CHANNEL 36 (31 - 39, adjustable)
Power requirement: 220 - 240V, 50Hz
Power consumption: 19 watts (in operation)/
8 watts (in stand by mode)
Weight: 4.0kg
Dimensions: 380(W) \times 92(H) \times 278(D) mm

VIDEO

Input: VIDEO LINE IN:
Phono-type connector, 1.0V (p-p),
75-ohms unbalanced, sync negative
Output: VIDEO LINE OUT:
Phono-type connector, 1.0V (p-p),
75-ohms unbalanced, sync negative
Signal-to-noise ratio: More than 43 dB

AUDIO

Input: AUDIO LINE IN:
Phono-type connector, -8dBs more than 47 k Ω
Output: AUDIO LINE OUT:
Phono-type connector, -8dBs less than 4.7 k Ω
Frequency response: 80 to 10 kHz
Signal-to-noise ratio: More than 42 dB

TAPE TRANSPORT

Tape speed: SP: 23.39 mm/sec
LP (V-303CZ): 11.7 mm/sec
Maximum recording-time: SP: 240 minutes (with E-240)
LP (V-303CZ): 480 minutes (with E-240)
Fast forward time: Within 3 min. (E-180)
Rewind time: Within 3 min. (E-180)

TIMER

Clock: 24 hour display, quartz control
No. of events: 4 over 1 week

Caution: Copyright Act 1956 Users of video recording equipment should note that it may be unlawful to record television broadcasts, cinematograph films or video recording without the permission of the relevant copyright owner.

Designs and specifications are subject to change without notice.

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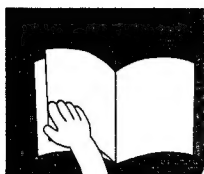
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SECTION 1

GENERAL DESCRIPTION

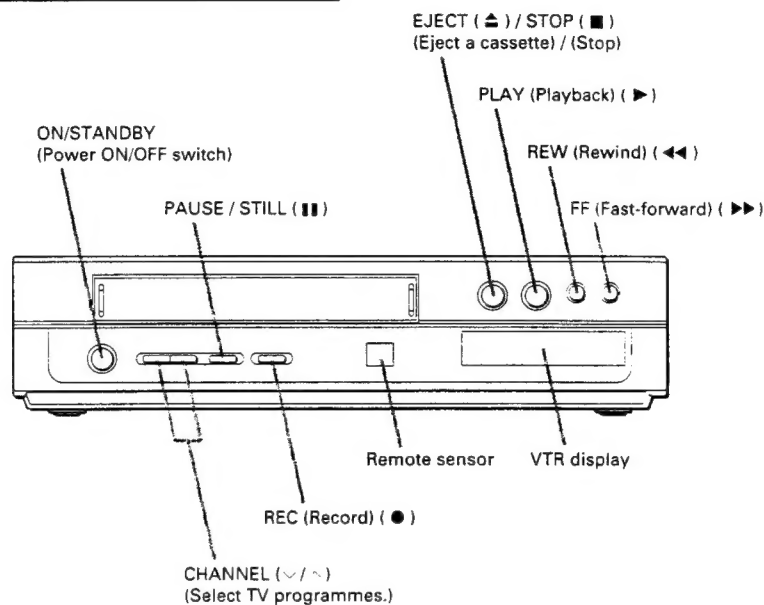
OPERATION INSTRUCTIONS

(V-203CZ)

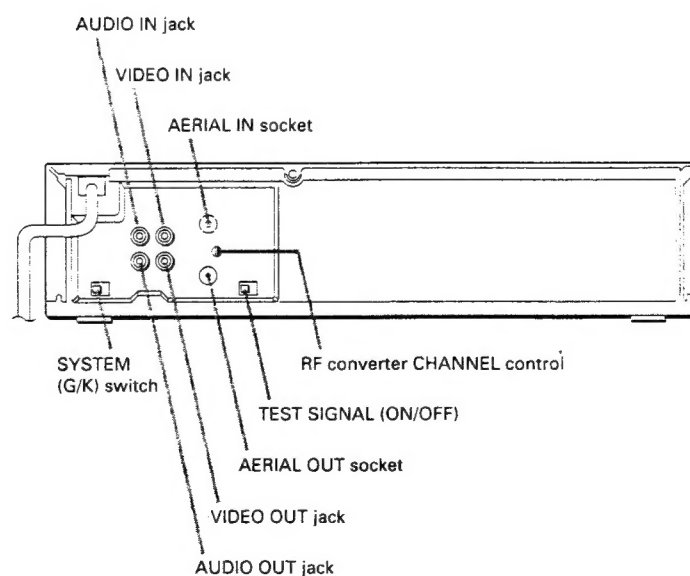


IDENTIFICATION OF CONTROLS

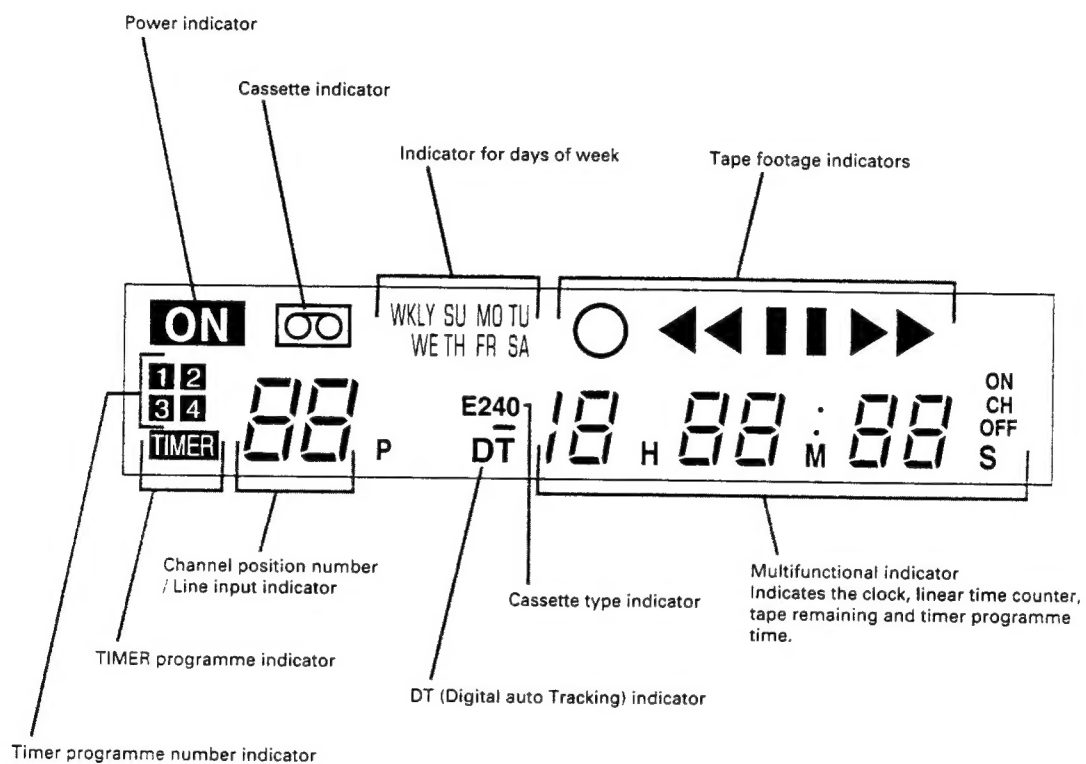
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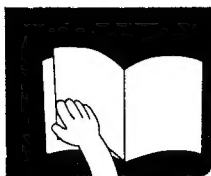


Rear Panel



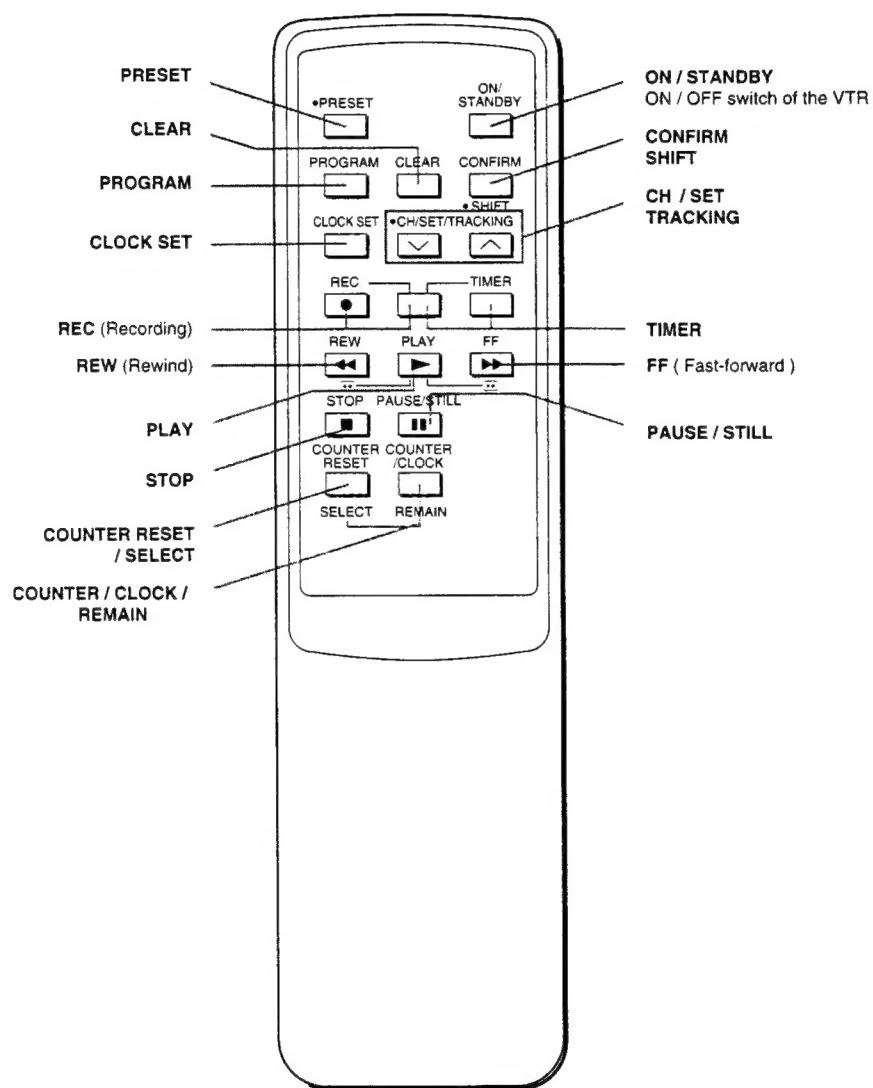
VTR Display





IDENTIFICATION OF CONTROLS

Remote Controller



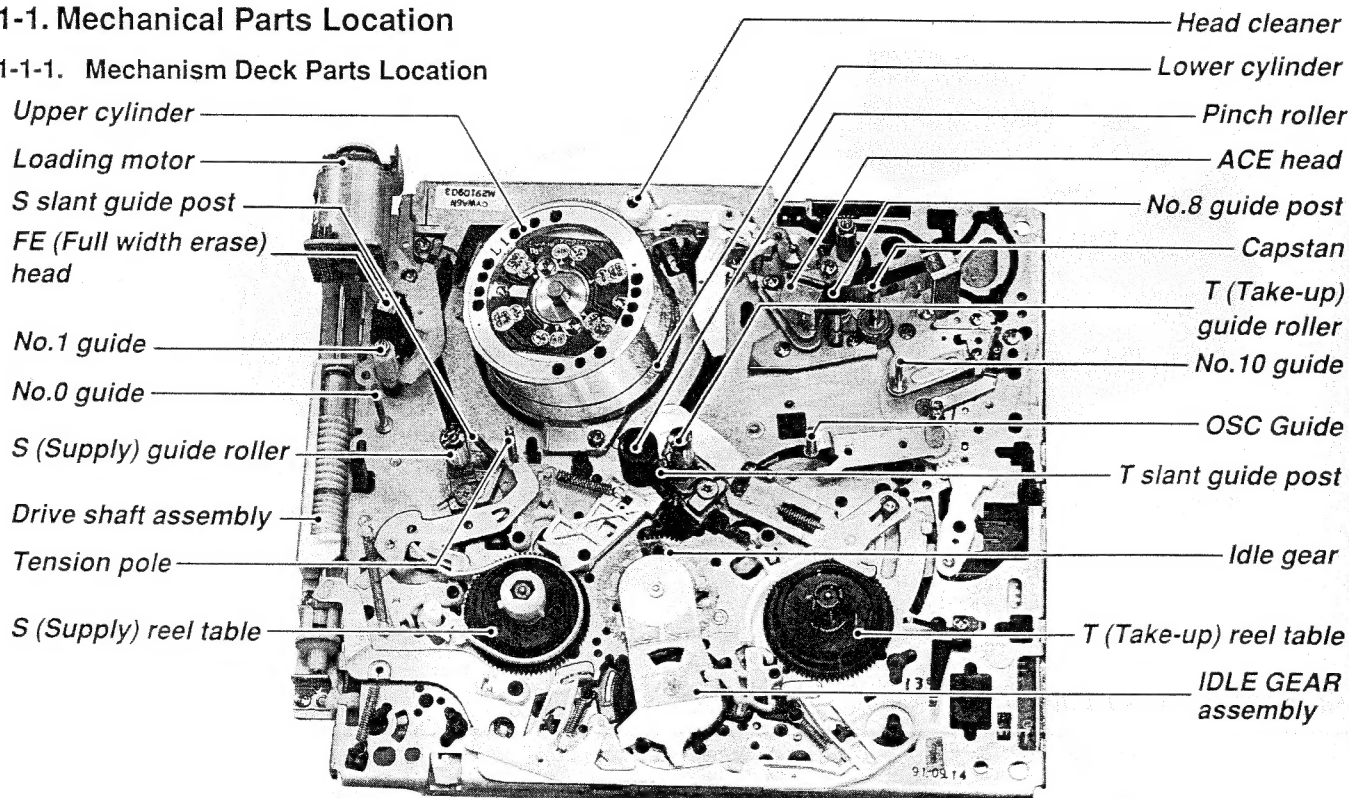
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ADJUSTMENT PROCEDURES

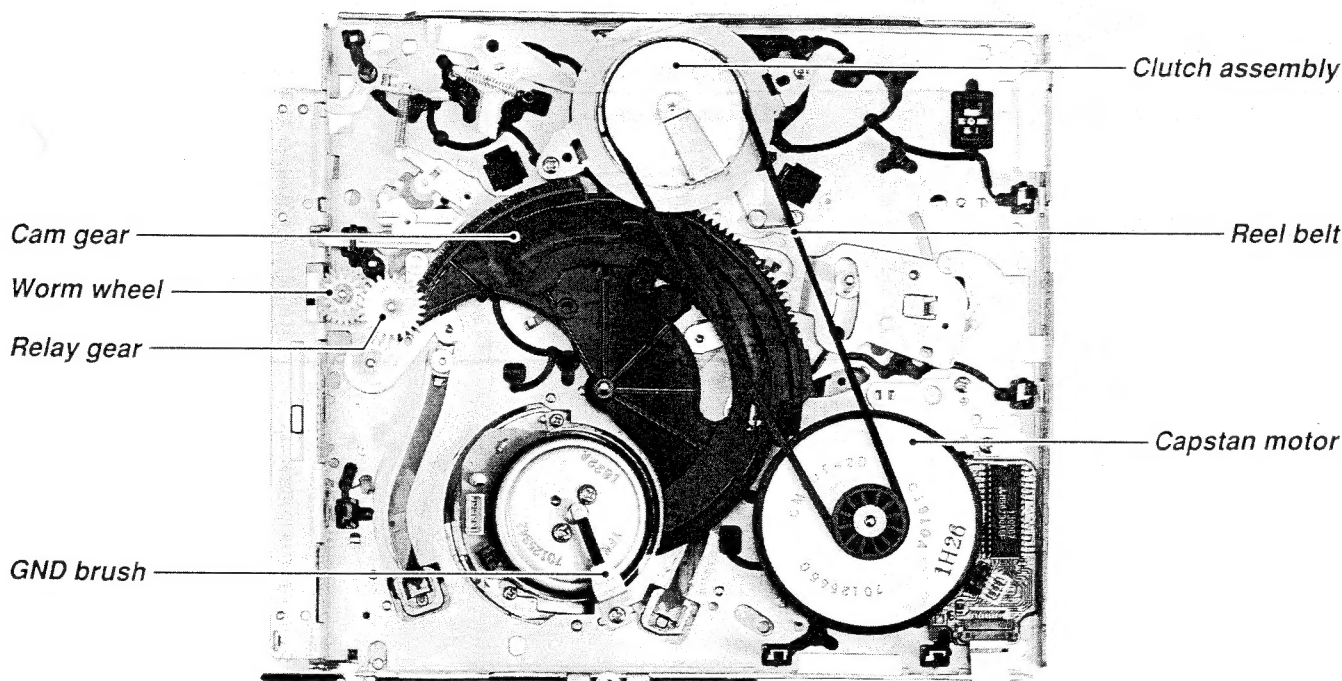
1. MECHANICAL ADJUSTMENT

1-1. Mechanical Parts Location

1-1-1. Mechanism Deck Parts Location

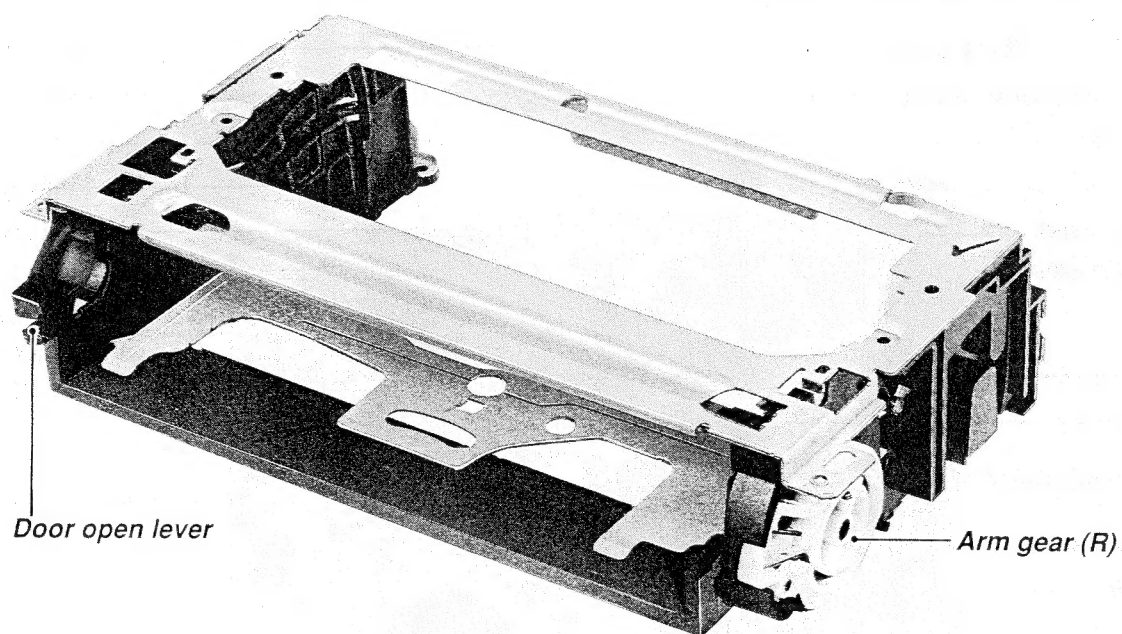


Top View

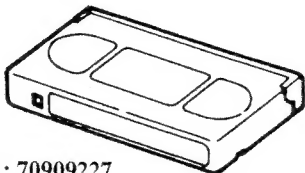
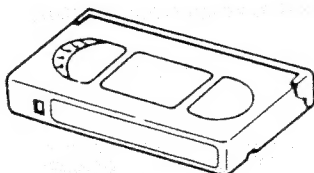
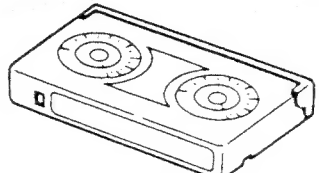
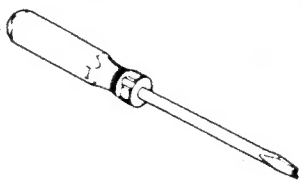
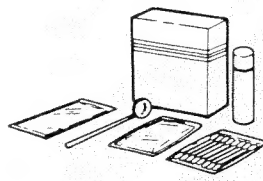
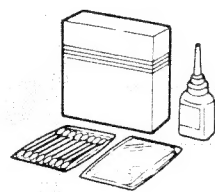



Bottom View

1-1-2. Front Loading Mechanism



1-2. Servicing Jig List

<p>Alignment tape</p>  <p>ST-C1: 70909227 ST-C3: 70909264</p>	<p>Back tension cassette gauge</p>  <p>70909103</p>	<p>Torque cassette gauge (KT-300NR)</p>  <p>70909199</p>
<p>Taper nut driver</p>  <p>70909228</p>	<p>VTR cleaning kit</p> 	<p>VTR oil kit</p> 
<p>Grease</p> 		

1-3. Main Parts Servicing Time

- Part replacement time differs from servicing life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions.

	Part Name	Servicing Time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension pole											• When cleaning, use a swab or a piece of gauze soaked in alcohol.
	S/T-slant guide post											
	Impedance roller*											
	No. 8 guide post	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	• After cleaning, cleaned parts are dried completely, and then load a video cassette.
	Capstan											
	OSC guide post											
	No. 0 guide post											• When lubricating, always use the specified oil.
	No. 10 guide post											
	S/T-guide roller	Δ	Δ	Δ	○	○	○	○	○	○	○	
	Upper cylinder	Δ	○	○	○	○	○	○	○	○	○	• When lubricating, apply one or two drops of oil after the cleaning with alcohol.
	FE head	Δ	Δ	Δ	○	○	○	○	○	○	○	
	ACE head	Δ	○	○	○	○	○	○	○	○	○	
Tape Drive System	Pinch roller	Δ	○	○	○	○	○	○	○	○	○	• Check the back tension.
	Capstan motor	Δ	Δ	Δ	Δ	Δ	○	○	○	○	○	
	Reel clutch		○	○	○	○	○	○	○	○	○	
	Loading motor				○	○	○	○	○	○	○	
	Loading belt & Reel belt	Δ	○	○	○	○	○	○	○	○	○	
	Supply reel table				▲				▲		○	
	Take-up reel table				▲				▲		○	
	Idle gear assembly	Δ	○	○	○	○	○	○	○	○	○	
Others	Band brake assembly		○	○	○	○	○	○	○	○	○	

Δ : Cleaning ▲ : Lubrication ○ : Check and replace if necessary

* There are two types. One type has an impedance roller and another type has no impedance roller.

1-4. Main Parts Replacement

1-4-1. Front Loading Assembly Replacement

(1) Front loading assembly replacement

1. Make sure that there is no cassette in the VTR.
2. Remove the top cover and the front panel.
3. Remove two screws (1).
4. Move the front loading assembly in the direction shown by the arrow (A) and remove it from the mechanism deck.
5. When remounting, use the above steps in reverse order.

Note:

- When removing the front loading assembly in the PLAY and/or REVIEW position(s) (the pinch roller is pressed to the capstan), push the tension pole to the cylinder direction and remove the front loading assembly.
- Before reinstalling the front loading assembly, check by pressing the worm gear in the direction of the arrow (B) that the worm gear does not engage the worm wheel (C).
- Before securing two screws, check that the F/L worm wheel engages without biting the tip of the worm gear.

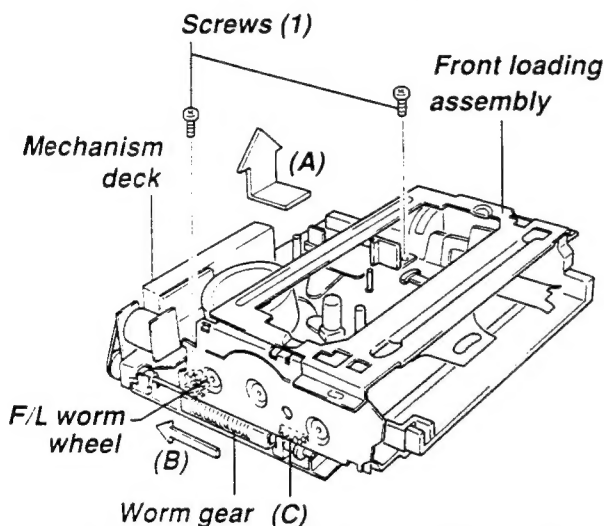


Fig. 4-1-1 Front loading assembly replacement

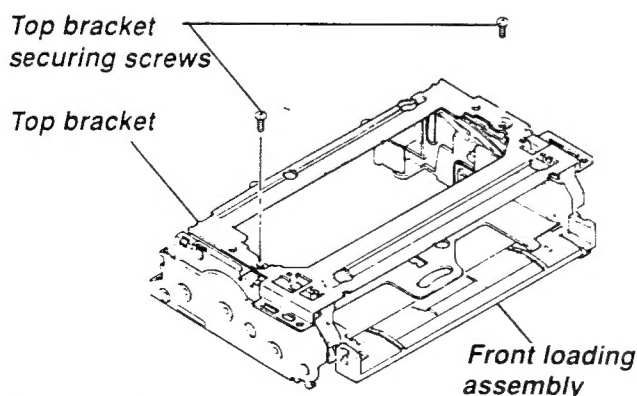


Fig. 4-1-2 Top bracket securing screw replacement

(2) Top bracket securing screw replacement

1. Remove the top bracket securing screw from the front loading assembly.
2. Remount a new top bracket securing screw on the front loading assembly.

(3) Arm gear R replacement

1. Move three claws (1) in the direction of the arrow and remove the arm gear R. (Refer to Fig. 4-1-4.)
2. Remove the spring R attaching to the arm gear R.
3. Replace the arm gear in the reverse order of removal. Take care not to mount the spring R on the opposite side.

Note:

- Align the cutout on the drive gear R and the ◀ mark on the arm gear R.
- Pay attention to positions of the boss (A) and the spring R. (Refer to Fig. 4-1-4.)
- When attaching the spring R, confirm that it is in a right position.
- Confirm that Boss (E) of the Fig 4-1-15 view (C) goes into groove (B).

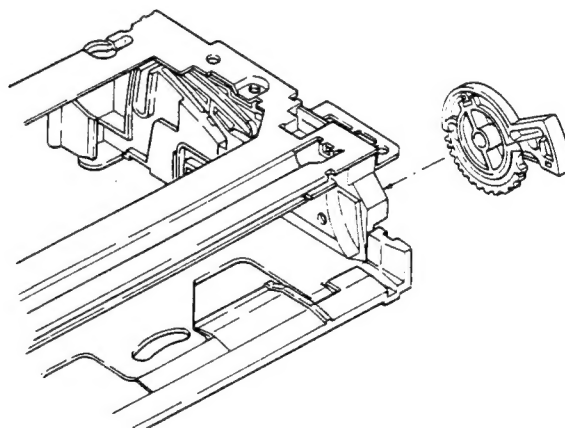


Fig. 4-1-3 Arm gear R replacement

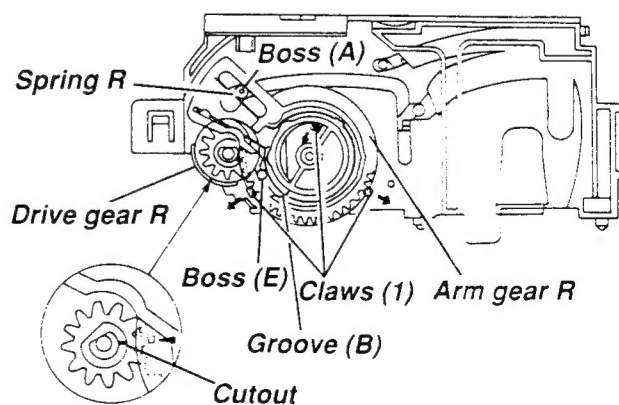


Fig. 4-1-4

(4) Door lever replacement

1. To remove the top bracket, remove the top bracket securing screws, push the claws (E) and (F), remove the top bracket upward and slide it in the direction of the arrow (H).
2. Push the claws of the side bracket L, (A), (B), (C) and (D), and remove (A)', (B)', (C)' and (D)' of the back-up plate side.
3. Replace the door lever according to the removing procedures in the reverse order.

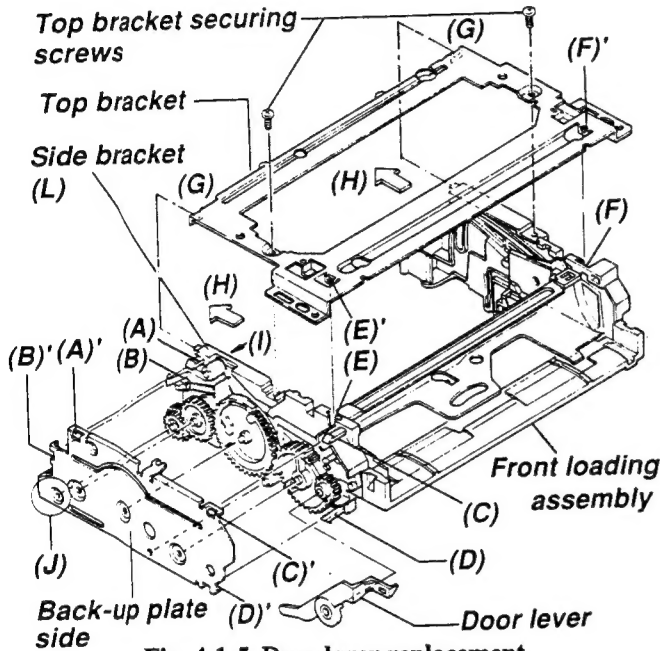


Fig. 4-1-5 Door lever replacement

Note:

- Take care that the end of the door lever (M) is put in the (P) between the walls, (L) and (K), of the arm gear L. (Refer to Fig. 4-1-6.)
- Take care that the end of the door lever (N) is positioned over the holder guide. (Refer to Fig. 4-1-6.)
- When mounting the back-up plate side, take care that its (J) section is positioned over the front loading assembly. (Refer to Fig. 4-1-6, Fig. 4-1-7.)

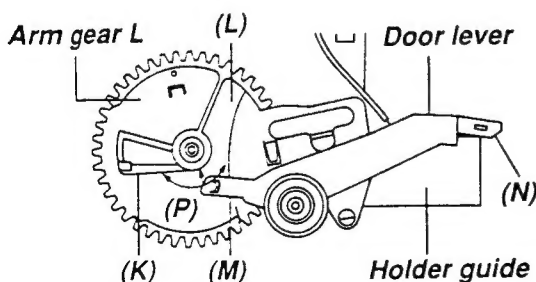


Fig. 4-1-6

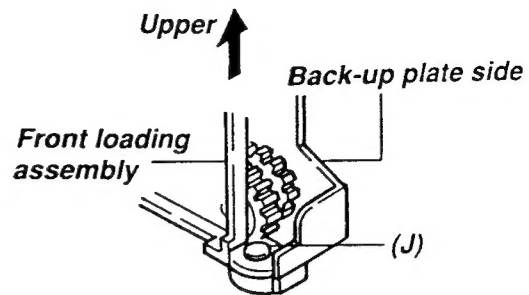


Fig. 4-1-7

(5) Arm gear L replacement

1. Remove the top bracket, back-up plate side and the door lever according to the door lever replacement procedure. (Refer to item "(4) Door lever replacement".)
2. Turn the arm gear L in the direction of the arrow (A) (to move the (D) section from the drive gear L) and remove it in the direction of the arrow (B).
3. Apply grease to the tip of the post (2) at the bracket side L (hatching portion).
4. Replace the arm gear L in the reverse order of removal.

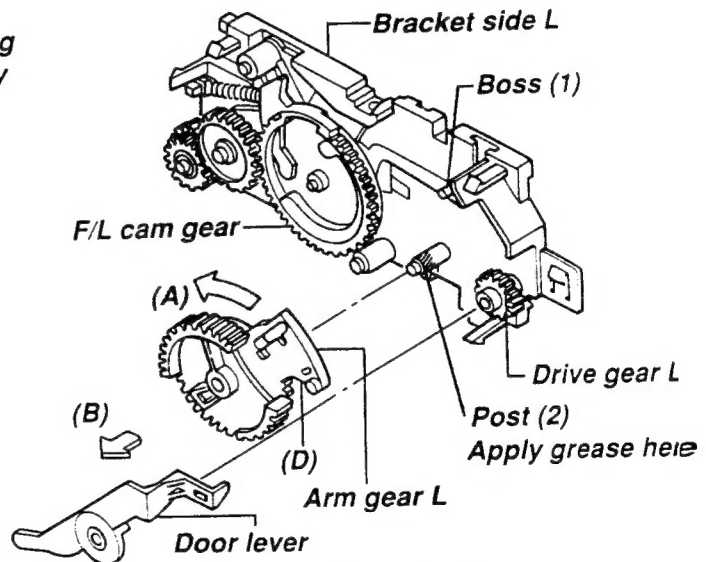


Fig. 4-1-8 Arm gear L replacement

Note:

- Align the (C) part of the drive gear L and the ▼ mark of the arm gear L shown by (C)'.
- Align the ▼ mark of the F/L cam gear and the tip of the upper gear of the arm gear L shown by (E).
- Make sure that the boss (1) and the spring are positioned as shown in Fig. 4-1-9.

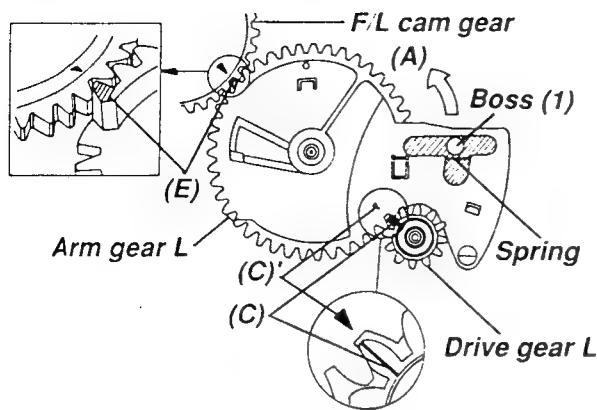


Fig. 4-1-9

(6) Relay gear replacement

1. Remove the top bracket and the back-up plate side. (Refer to item "(4)1., 2. Door lever replacement".)
2. Remove the relay gear in the direction of the arrow and apply grease to the tip of the relay gear post.
3. Reinstall a new relay gear in the reverse order of removal.

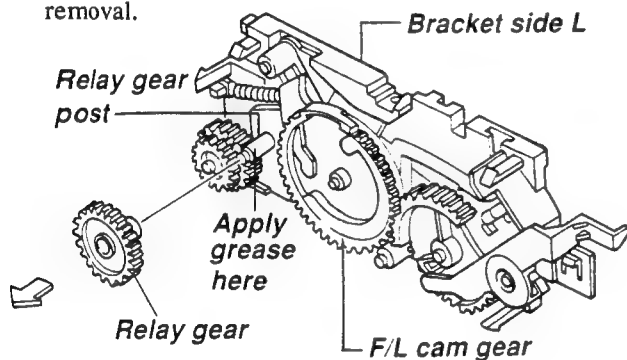


Fig. 4-1-10 Relay gear replacement

(7) F/L cam gear replacement

1. Remove the top bracket and the back-up plate side. (Refer to item "(4) 1., 2. Door lever replacement".)
2. Remove the relay gear and then remove the F/L cam gear.
3. Apply grease to the relay gear post at the bracket side L and the tip of the F/L cam gear post.
4. Replace the F/L cam gear and apply grease to the outer surface of the gear of the F/L cam gear.
5. Reinstall the F/L cam gear by reversing above procedures.

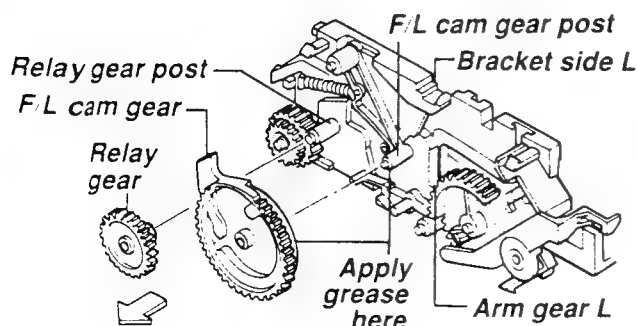


Fig. 4-1-11 F/L Cam gear replacement

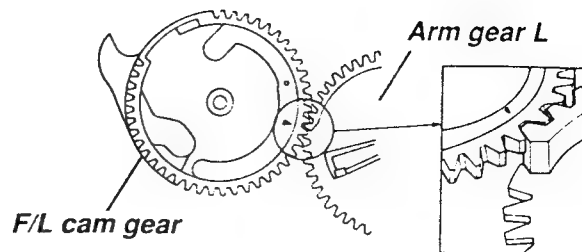


Fig. 4-1-12 Phase matching

Note:

- Align the ▼ mark on the F/L cam gear and the tip of the gear tooth (thicker) of the arm gear L. (Refer to Fig. 4-1-12.)

(8) F/L worm wheel replacement

1. Remove the top bracket and the back-up plate side. (Refer to item "(4)1., 2. Door lever replacement".)
2. Remove the relay gear and then remove the F/L worm wheel.
3. Apply grease to the tip of the worm wheel post.
4. Reinstall a new F/L worm wheel using the previous steps in reverse order.

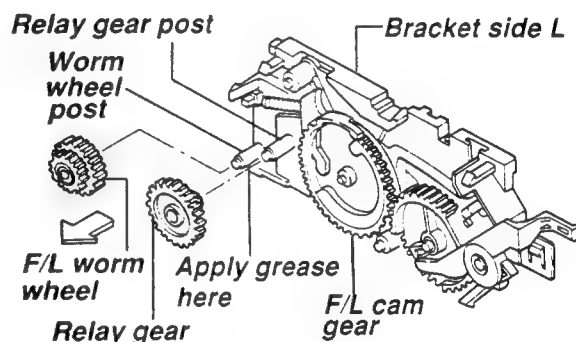


Fig. 4-1-13 F/L worm wheel replacement

(9) Door lock lever replacement

1. Make the cassette holder assembly slid to an about 30 mm inner side.
2. Push two claws (A)' of the front loading assembly in the direction of the arrow and remove the holder guide upward.
3. Remove the arm gear R. (Refer to item "(3) Arm gear R replacement".)
4. Remove the door lock spring from the hook (D) of the front loading assembly. (Refer to Fig. 4-1-15.)
5. Remove the door lock lever from the drive shaft (F/L) and remove the door lock spring from the door lock lever.
6. Mount a new door lock lever in the reverse order of removal.

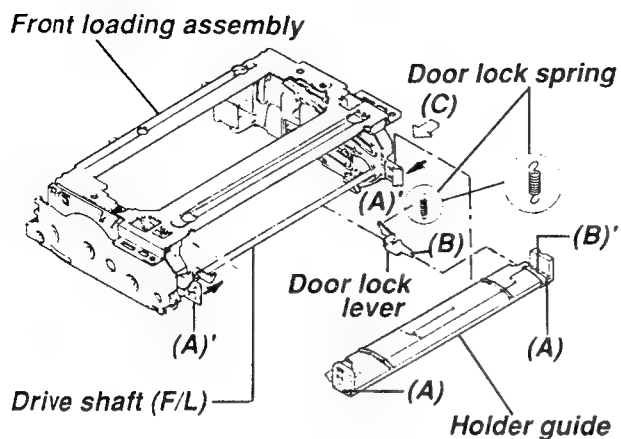


Fig. 4-1-14 Door lock lever replacement

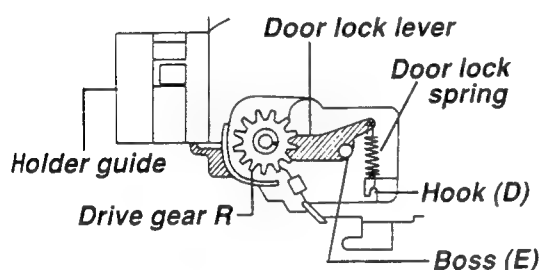


Fig. 4-1-15 View (C)

Note:

- Take care not to give permanent deformation to the door lock spring.
- In installing the holder guide, insert the tip of the door lock lever (B) into the hole (B') on the holder guide.
- Confirm that boss (E) goes into groove (B) of Fig. 4-1-4.

(10) Door lock spring replacement

1. Remove the holder guide and the door lock lever. (Refer to item "(9) Door lock lever replacement").
2. Remove the door lock spring from the door lock lever.
3. Mount a new door lock spring in the reverse order of removal.

(11) Drive shaft (F/L) assembly replacement

1. Remove the arm gear R according to the replacement procedure for the arm gear R. (Refer to item "(3) Arm gear R replacement".)
2. Remove the holder guide and the door lock lever. (Refer to item "(9) Door Lock Lever Replacement".)
3. Remove the top bracket. (Refer to item "(4) Door lever replacement 1.").

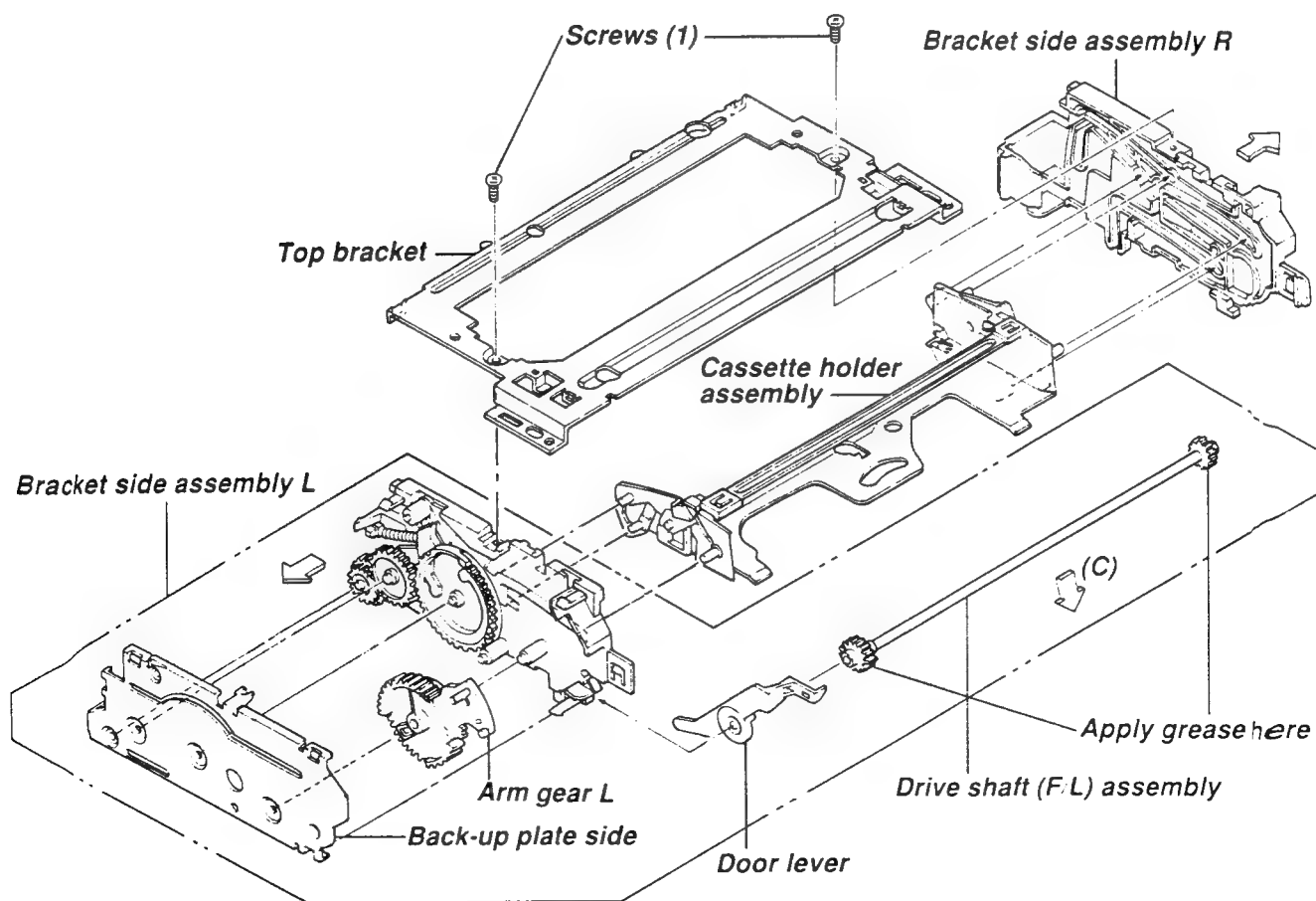


Fig. 4-1-16 Drive shaft (F/L) assembly replacement

4. Remove the bracket side assembly R and the bracket side assembly L from the cassette holder assembly.
5. Remove the back-up plate side from the bracket side assembly L. (Refer to item "(4) Door lever replacement 2.").
6. Remove the door lever and then arm gear L from the bracket side assembly L. (Refer to item "(4) Door lever replacement" and "(5) Arm gear L replacement".)
7. Remove the drive shaft (F/L) assembly from the bracket side assembly L in the direction of the arrow (C). (This can be removed by bending the wall (D) in the direction (A).) (Refer to Fig. 4-1-17.)
8. After replacing the drive shaft (F/L) assembly, apply grease to the outer surface of the gear.

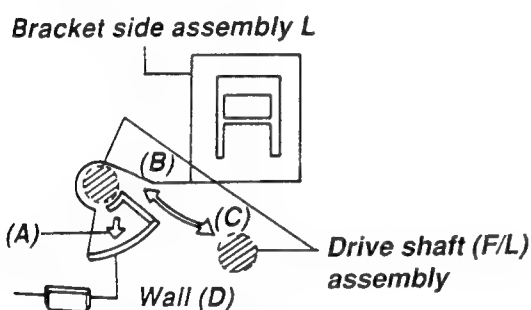


Fig. 4-1-17

9. Install the drive shaft (F/L) assembly according to the reverse procedure.
10. Make sure that it is operating normally.

Note:

- When mounting the bracket side assembly L on the cassette holder assembly, let bosses (E), (F) and (G) of the cassette holder through the grooves on the bracket side assembly L, (E)', (F)' and (G)' respectively. Also pass the boss (E) between the groove (E)" on the arm gear L and spring (2) (upper side). (Refer to Fig. 4-1-18.)
- When mounting the bracket side assembly R on the cassette holder assembly, pass bosses (H), (I), (J) and (K) through the grooves on the bracket side assembly R, (H)', (I)', (J)' and (K)' respectively. (Refer to Fig. 4-1-19.)

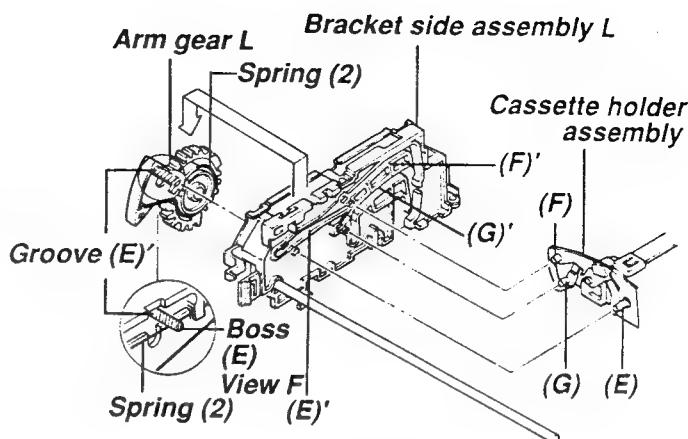


Fig. 4-1-18

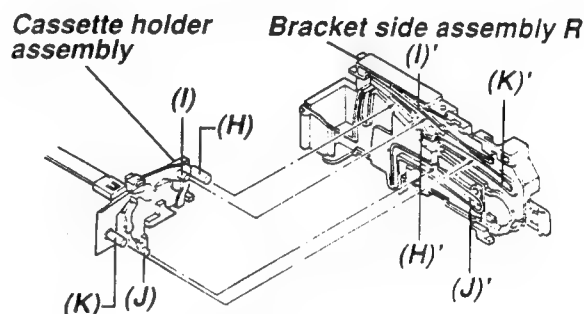


Fig. 4-1-19

1-4-2. Cylinder Replacement

(1) Upper cylinder assembly

<Inspection>

1. Check if the video heads are damaged or worn out.
2. Check the video heads for clogging. (Replace the upper cylinder assembly if the clogging is not remedied after cleaning).

<Replacement>

1. Remove two screws (2) and remove the upper cylinder assembly.
2. Clean the new cylinder assembly (3) and the flange (5) mounting surface with a cleaning kit.
3. Align the head (A) (P.C. board's color : green) and the marker on the rotary transformer P.C. board (4) and then mount the upper cylinder assembly (Tightening torque: 3 - 4kg.cm).

Note:

Take care not to touch the connector assembly or not to give deformation to the spring.

4. Perform the tape transport adjustment.

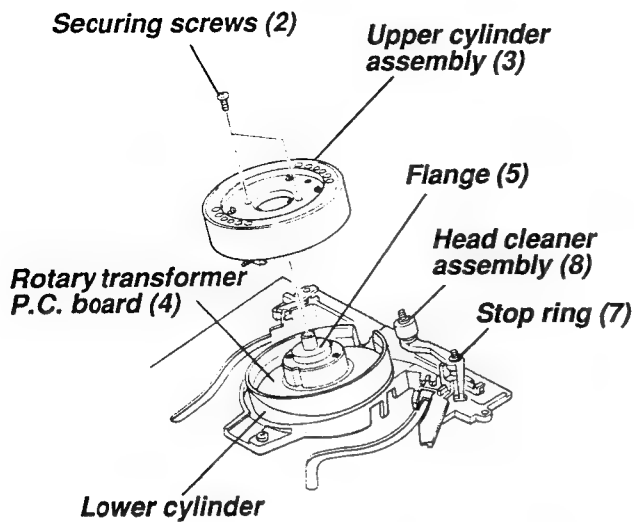


Fig. 4-2-1 Upper cylinder replacement

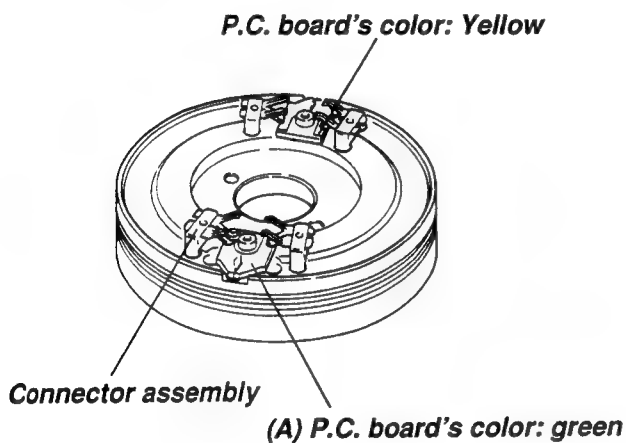


Fig. 4-2-2



Fig. 4-2-3

(2) Cylinder motor

<Inspection>

1. Independently apply power to the cylinder motor.
2. If the motor does not turn, replace the rotor and the stator.

<Rotor replacement>

1. Remove the mechanism P.C. board securing screw to remove the mechanism P.C. board.
2. Remove the ground brush securing screw to remove the ground brush.
3. Remove the ground cap.
4. Remove two rotor screws (1) and replace the rotor (3) (Tightening torque: 3 – 4 kg.cm).

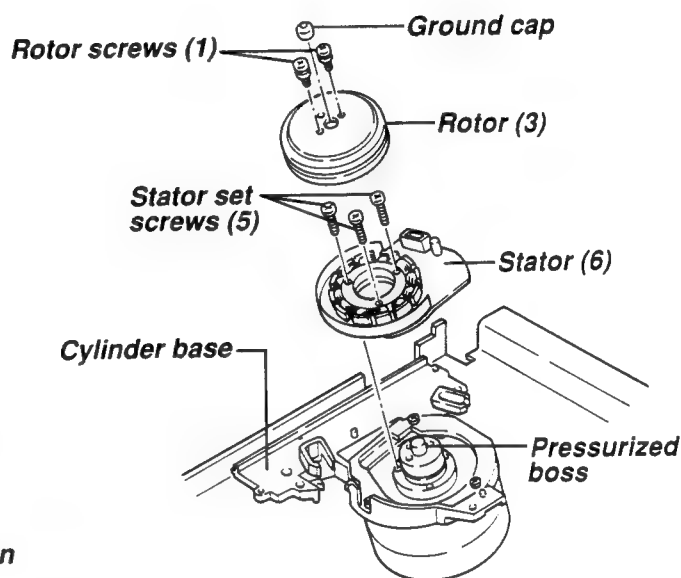


Fig. 4-2-4 Cylinder motor replacement

Note:

When assembling a new rotor, align the two phase matching holes to fit the rotor and the pressurized boss (4) (Fig. 4-2-5).

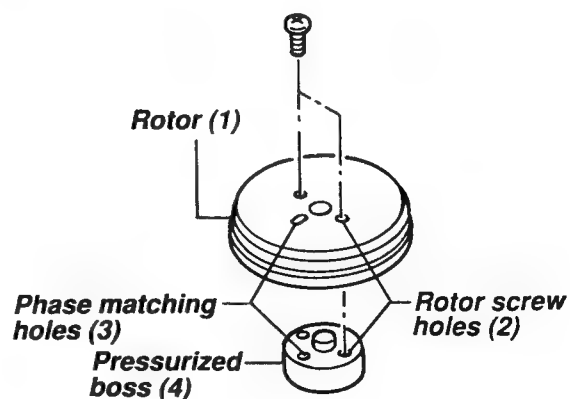


Fig. 4-2-5 Phase matching of rotor pressurized boss

<Stator replacement>

1. Remove the mechanism P.C. board securing screw to remove the mechanism P.C. board.
2. Remove the ground brush securing screw to remove the ground brush.
3. Remove the ground cap.
4. Remove two rotor securing screws (1) and remove the rotor (3). (Fig. 4-1-4.)
5. Remove the stator securing screws (5).
6. Replace the stator (6) by pulling it out (Tightening torque: 1.5 – 2.5kg.cm).
7. Reassemble the cylinder according to the reverse procedures.

(3) Cylinder assembly

<Inspection>

1. Check if rotating surface of the lower cylinder has no damages such as scratches, cracks, etc.
2. Check to see smooth rotation of the upper cylinder. If abnormality is found, replace the cylinder assembly.

<Replacement>

1. Remove the preamplifier (1) by removing two securing screws (8).
2. Disconnect the connector (2).
3. Remove three cylinder securing screws (4).
4. Remove the cylinder assembly (5).
5. Position the cylinder base (7) first. Mount a new cylinder assembly using the previous steps in reverse order, taking care not to touch the video heads directly and not to damage the cylinder surface.
6. Perform the tape transport adjustment.

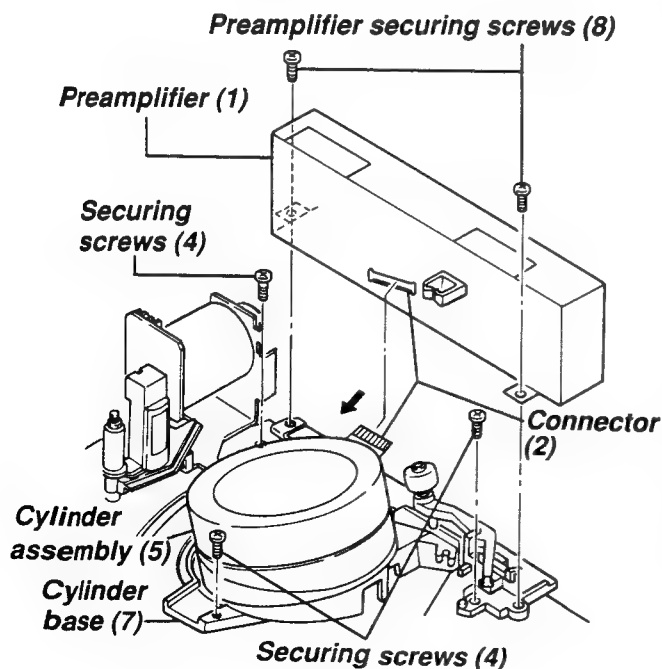


Fig. 4-2-6 Cylinder assembly replacement

(4) Lower cylinder assembly

<Inspection>

1. Check if rotating surface of the lower cylinder has no damages such as scratches, cracks, etc.
2. Check to see smooth rotation of the lower cylinder.
3. Check if the P.C. board is not damaged. If any abnormality is found, replace the cylinder assembly.

<Replacement>

1. Remove the cylinder assembly (Fig. 4-1-6).
2. Remove the ground cap (5).
3. Remove the rotor (11).
4. Remove the stator (13).
5. Remove the cylinder base securing screw (14) and then the cylinder base (15) can be removed.
6. Remove the upper cylinder assembly (17). (Refer to item "1-4-2".)
7. Replace the lower cylinder assembly (16).
8. Mount a new cylinder assembly using the previous steps in reverse order, taking care not to touch the video heads directly or not to damage the cylinder.
9. Perform the tape transport adjustment.

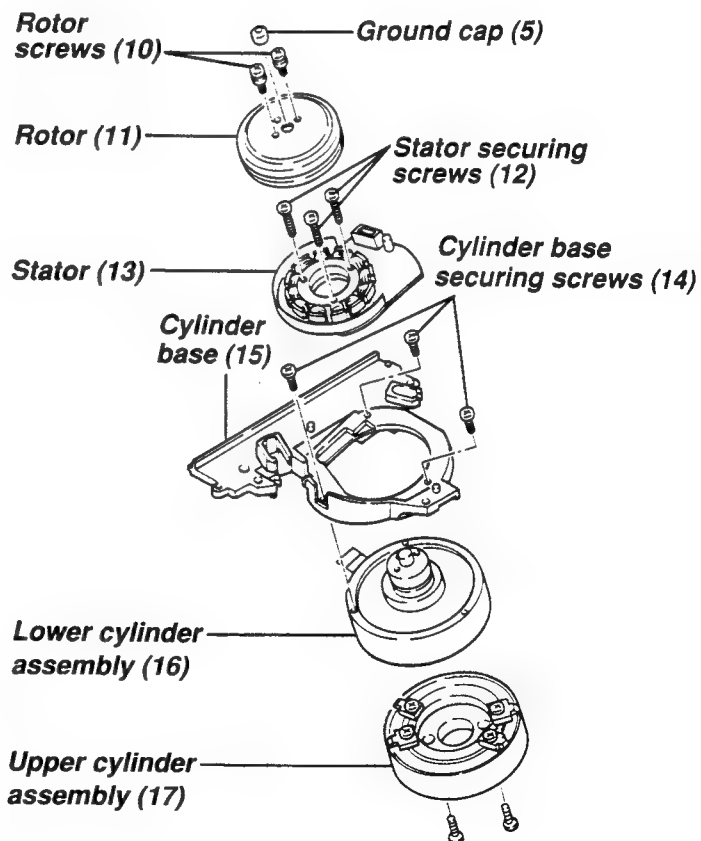


Fig. 4-2-7 Lower cylinder assembly replacement

(5) Head cleaner assembly replacement

1. Remove the spring (1) from the hook at the ACE base (A).
2. Remove the stop ring (2) and remove the head cleaner assembly (3).
3. Replace the head cleaner assembly in the reverse order of removal.

Note:

- Take care that the head cleaner roller (B) is not contaminated by grease, oil, dust, etc.
- After remounting, check to see the head cleaner assembly is smoothly rotating and the stopper (C) is attached to the cylinder base (D).

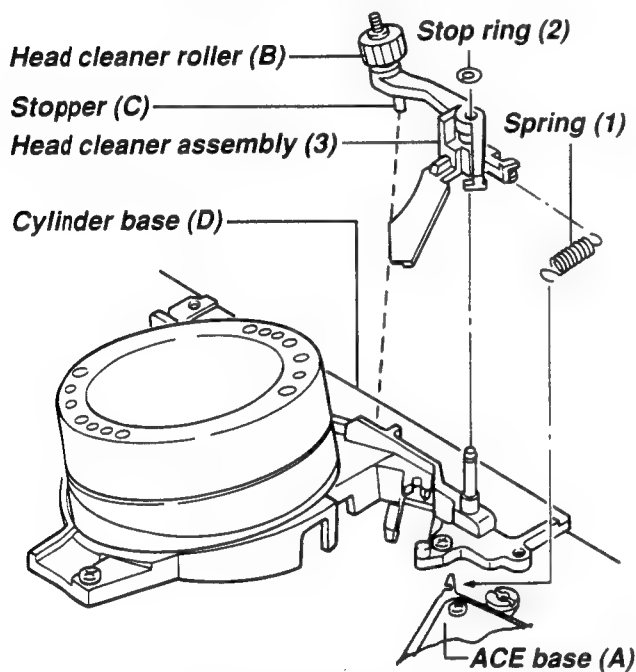


Fig. 4-2-8 Head cleaner assembly replacement

1-4-3. Transport System Parts Replacement

(1) ACE head assembly replacement

1. Disconnect the FPC (8) from the connector.
2. Remove the head cleaner spring (13) from ACE main base (1).
3. Remove the taper nut (3).
4. Turn the ACE height adjusting nut (7) counterclockwise and remove it upward in order to remove the ACE base assembly (5).

Note:

Note positions of ACE main base (1) and the upper surface of taper nut (3).

5. Remove the E-ring (9) and the azimuth adjusting screw (2) in order to remove the ACE head assembly (11).
6. Replace the ACE head assembly (11), according to the reverse procedures.
7. Mount the taper nut (3) and the spring (13) in the reverse order of removal and insert the FPC (8) into the connector.

Note:

- When mounting ACE torsion spring (4), first insert the tip of the spring into the hole on the main base and then hook the opposite tip of the spring to ACE main base (1) which has been inserted into ACE post (12). Mount the taper nut (3) while moving the base (1) counterclockwise with your hand.

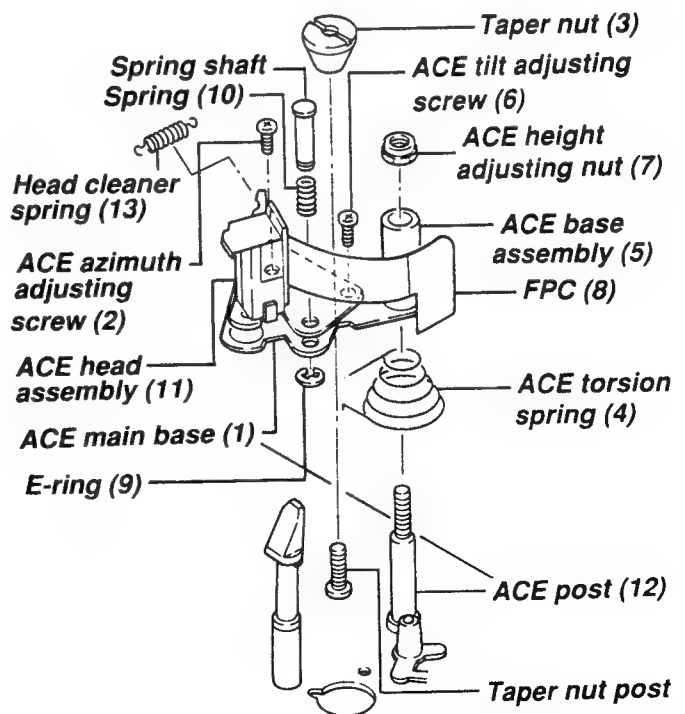


Fig. 4-3-1

(2) No. 8 guide sleeve replacement

1. Remove No. 8 cap (1) and No. 8 guide sleeve (2) in this sequence as shown in Fig. 4-3-2. When reassembling, perform the previous steps in reverse order.
2. To mount No. 8 guide sleeve (2), insert No. 8 cap (1) onto No. 8 post (3) and push the cap downward while turning it left and right.

Note:

- No. 8 guide sleeve functions as reference for tape transport, so the replacement should be made carefully not to damage the main base flatness.
- When mounting the No. 8 cap, mount the cap with its slant surface facing to cassette side.
- The guide sleeve has a directional characteristic, so take care when inserting it. Do not insert it upside down. The lower flange thickness is higher than the upper thickness by about 1.6mm.

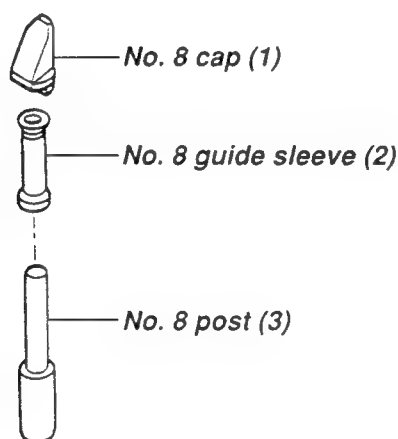


Fig. 4-3-2

(3) FE head replacement

1. Disconnect the 2P connector of the FE head.
2. Remove the FE head mounting screw (5) shown in Fig. 4-3-3 and the FE head (6) can be removed.
3. Remount a new FE head and tighten the FE head mounting screw (5).
4. Connect the 2P connector.
5. Perform the transport adjustments, starting check from the linearity adjustment.

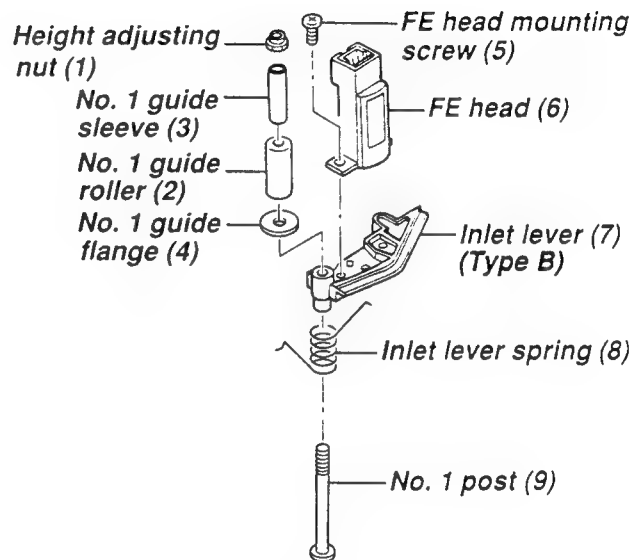


Fig. 4-3-3

(4) No. 1 guide roller replacement

1. Remove the nut (1) shown in Fig. 4-3-3 and then remove the No. 1 guide roller (2).
When removing the nut (1), note that inlet lever (7) detaches from stopper and the lever does not hit cylinder.
(Before removing, note the number of threads exceeding the surface of the nut of the inlet lever. Take care that the lever does not hit the cylinder by removing the lever from the stopper when the nut is removed.)
2. Mount the No. 1 guide roller according to the reverse procedures. (Tighten the nut until the same thread number appears so that the roller will be of the same height as before.)
3. After replacing the No. 1 guide roller, perform the tape transport adjustment, starting from the linearity adjustment.

Note:

- Confirm that inlet lever is in the position which is shown in Fig. 4-4-2.

(5) Impedance roller replacement

(Depending on the model, the impedance roller is included.)

1. Remove the impedance roller cap (10), shown in Fig. 4-3-4.
2. Remove the stop ring (11).
3. Mount a new impedance roller assembly in the reverse order of removal.
4. After replacement of the impedance roller, perform the tape transport adjustment from the linearity adjustment.

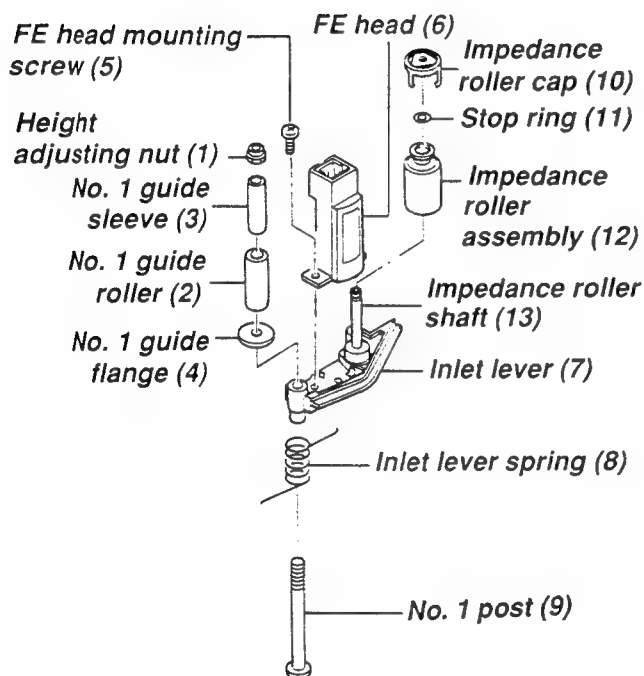


Fig. 4-3-4

(6) S, T-guide rollers replacement

The same replacement procedures will be applied for both S and T-guide rollers.

1. Loosen the set screw (2), shown in the Fig. 4-3-5.
2. Turn the guide roller (1) counterclockwise and remove it.
3. Replace the guide roller by reversing the procedures.
4. After replacing the guide roller, perform the tape transport adjustment from the linearity adjustment.

Note:

- Take care since this guide roller has no O-ring.
- Tighten the set screw (2) with light pressure to allow the guide roller height to be adjusted.
- The T-guide roller has a mark on the upper flange, while the S-guide roller has no mark. Do not exchange them when remounting.

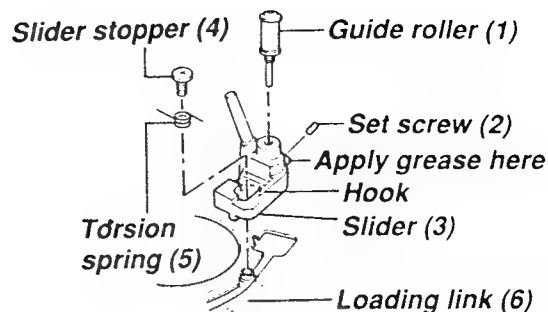


Fig. 4-3-5

(7) S, T-sliders replacement

1. Remove the cylinder assembly.
2. Move the slider up manually to the loading position.
3. Remove the slider stopper (4) and the torsion spring (5), shown in Fig. 4-3-5.
4. Remove the guide roller and reinstall it in a new slider according to the procedures for replacement of S, T-guide rollers.
5. Replacement is made by reversing above procedures. When mounting the torsion spring and the slider stopper, hold the rear side of the loading link (6), shown in Fig. 4-3-5 from the cylinder mounting hole.
6. After completion of the replacement, perform the rough adjustment in the tape transport adjustment.

Note:

- Place the torsion spring in such a way that the shorter arm will come at the bottom. When mounting the slider stopper, confirm the torsion spring is not positioned over the hook at the slider.
- When the slider is replaced, always apply grease to the slider receptacle as shown in Fig. 4-3-5.

(8) S, T-loading torsion springs replacement

The same replacement procedures will be applied for both S and T-loading torsion springs.

1. Remove the front loading assembly.
2. Place the deck vertically and remove the bottom plate and the mechanism P.C. board.
3. Remove the slider stopper (4) and the S, T-loading torsion springs (5) shown in Fig. 4-3-5. with the slider set to the unloading state.
4. When replacing, use above steps in reverse order. Remount the S, T-loading torsion springs while holding the rear side of the loading link (6), shown in Fig. 4-3-5.
5. After completion of the replacement, perform the transport adjustment from the linearity adjustment.

Note:

- The form of the torsion spring differs according to the slider type, S or T. Confirm that you take the right one in mounting.
- The torsion spring is placed in such a way that the shorter arm will come at the bottom. When mounting the slider stopper, check to see that the torsion spring is not positioned over the hook at the slider.

(9) OSC guide lever assembly replacement

1. Remove the front loading assembly.
2. Remove the OSC guide nut (1) by turning it counterclockwise and remove the OSC guide lever assembly (2) together with the spring (3) upward by turning them counterclockwise.

Note:

- Note the number of threads exceeding the surface of the nut.
3. Replace the OSC guide lever assembly (2) with a new one.

Note:

- After completion of the replacement, place the hook at the upper end of spring (3) on the lever (2) to keep the OSC guide lever assembly with the hook attached.
4. Assemble by reversing above procedures. At that time, tighten the nut (1) so that the position of it is the same as before.

Note:

- Make sure that the OSC drive lever (4) matches the gear of the OSC guide lever assembly (2). (Align each protruded part.)
- Apply grease to the contacting surface between the OSC guide lever assembly (2) and the nut (1) and around the base of post (5).
- Note that the upper and lower sides of the nut are not mistaken.
- When mounting the OSC guide lever in the main base, note that it does not bend by touching cassette datum post.

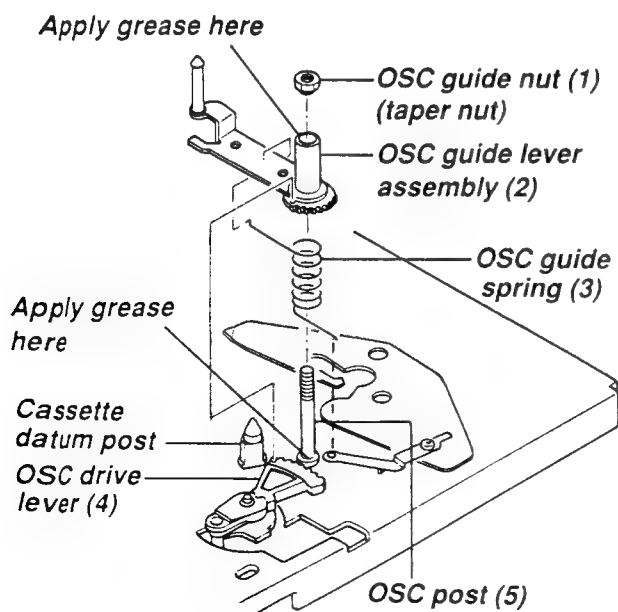
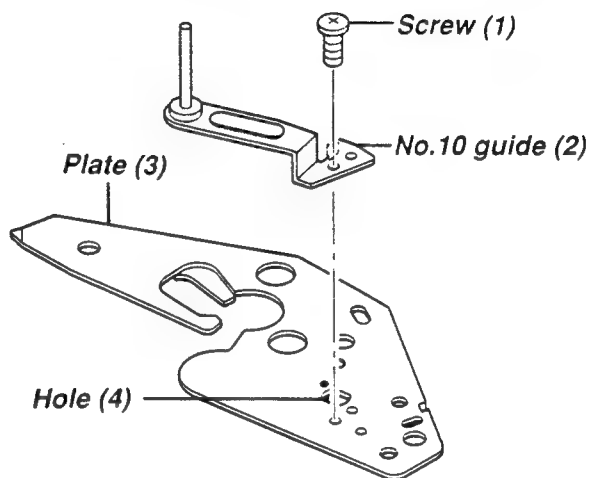


Fig. 4-3-6

5. After completion of the replacement, perform the adjustment according to item "2-5-4. (3) 5) OSC guide lever adjustment".

(10) No. 10 guide replacement

1. Remove the front loading assembly.
2. Remove the screw (1) and remove No. 10 guide (2).
3. Assemble by reversing above procedures.
4. After completion of the replacement, perform the tape transport adjustment from the OSC guide lever adjustment.



Put the stopper portion of No.10 guide into the hole (4), and tighten the screw (1)

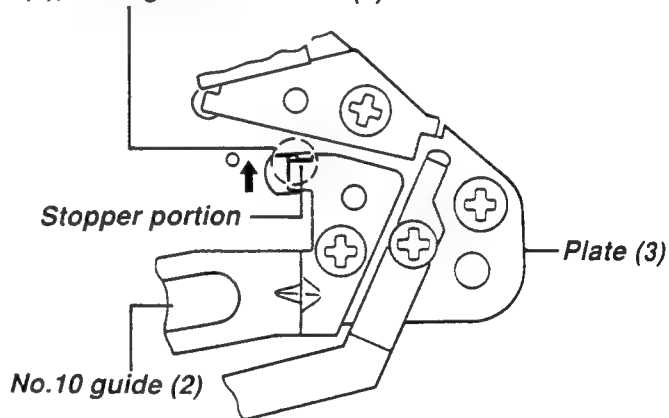


Fig 4-3-7

1-4-6. Drive Shaft Assembly Replacement

1. Remove the main brake charge lever according to the main brake charge lever mounting procedure. (Refer to item "1-4-7 (2)".)
2. Remove the loading belt and loading motor assembly according to the loading motor assembly replacement procedures. (Refer to item "1-4-4. Loading Motor Assembly Replacement".)
3. Remove two screws (2) and remove the drive shaft assembly.
4. Remount the drive shaft by reversing above procedures.

Note:

- Insert the projection (G) of the drive shaft assembly into the hole (G') on the main base and energize the worm section in the direction of the arrow (F). (The worm section should not engage the gear (H).)
- As shown in Fig. 4-6-2, place the pot MB clutch with its projection (E) facing to the inside of the main base and the groove section facing upward. (At this time, the spring can be watched from the upper side).
- The worm part of the drive shaft assembly should be applied grease.

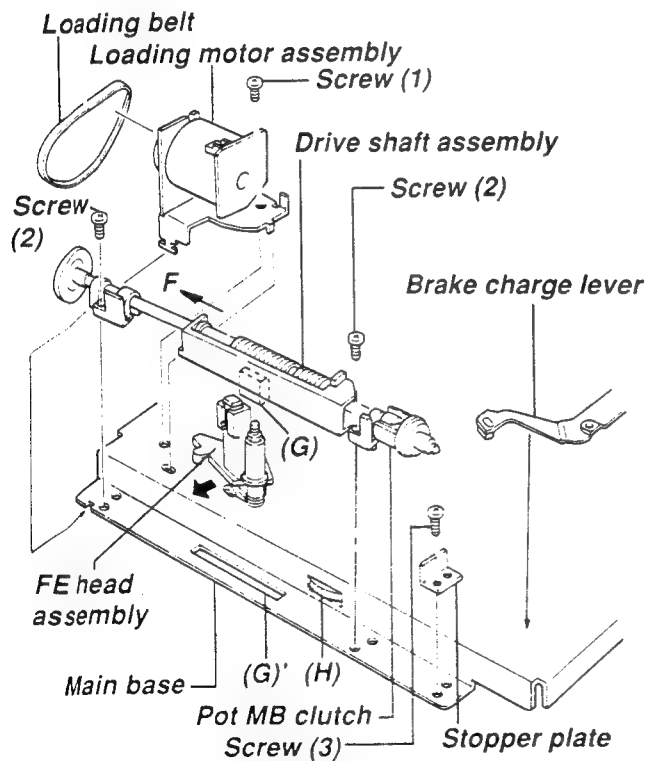


Fig. 4-6-1 Drive shaft assembly replacement

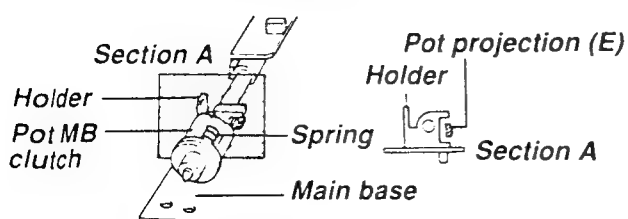


Fig. 4-6-2 Position of pot MB clutch

1-4-7. Main Brake System Parts Replacement

(1) Main brake lever assembly replacement

1. Remove the front loading assembly.
2. Remove the springs from the hooks (1) and (2) of the main base.
3. Remove the main brake lever assembly upward by sliding it in the direction of the arrows (B) and (D) while pushing the chassis in the direction of the arrows (A) and (C).
4. Mount a new main brake lever assembly in the reverse order of removal.

Note:

- When replacing the main brake lever, take care not to touch the pad surface of the brake.

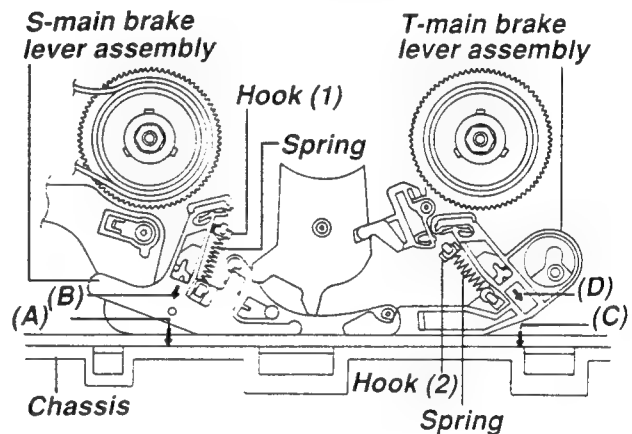


Fig. 4-7-1

(2) Main brake charge lever replacement

1. Remove the front loading assembly.
2. Remove the S, T-main brake lever assemblies. (Refer to item (1).)
3. Remove the spring from the hook (1) of the main base.
4. When removing the main brake charge lever, turn the idle arm assembly in the direction of the arrow (A) and push the hooks (2) and (3) in the direction of the arrows (C) and (D) while lifting the (B) section slightly.
5. Mount new main brake charge levers in the reverse order of removal.

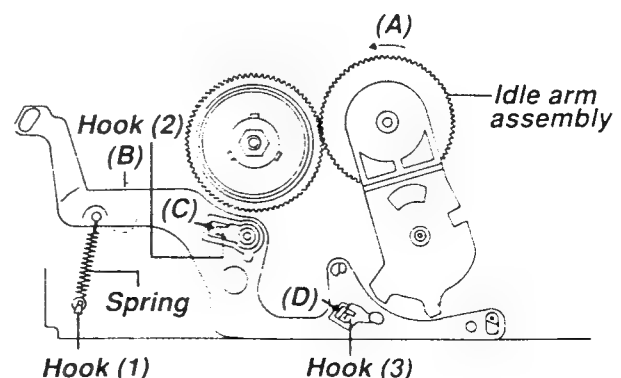


Fig. 4-7-2

1-4-4. Loading Motor Assembly Replacement

1. Remove the loading belt.
2. Remove the screw (1) and remove the loading motor assembly from the main base.
Note that the lever of FE head assembly does not hit the cylinder.
3. Replace the loading motor assembly in the reverse order of removal. When remounting, turn the FE head assembly in the direction shown by the arrow.

Note:

- Take care that the loading belt is not twisted.
- Make sure that the protruded part (D) of the FE head assembly is positioned at the left of the wall (C) of the loading motor assembly.

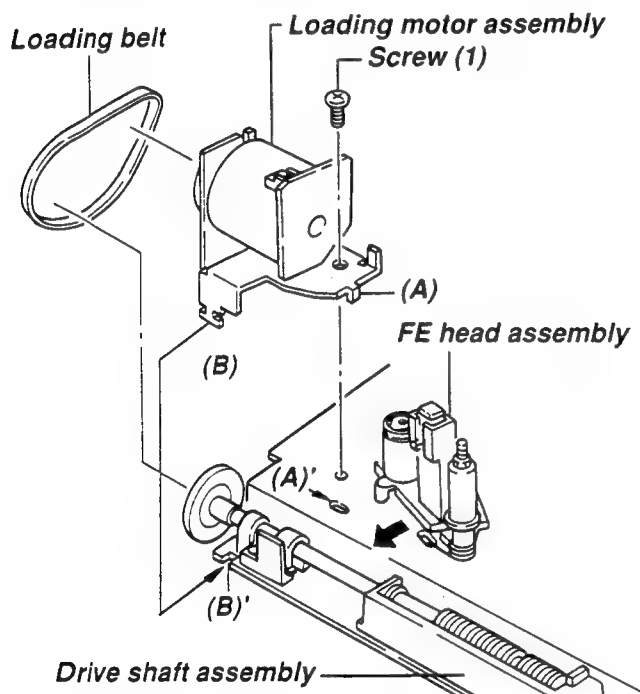


Fig. 4-4-1 Loading motor assembly replacement

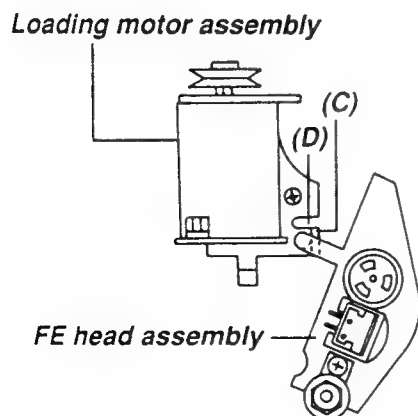


Fig. 4-4-2

1-4-5. Stopper Plate Replacement

1. Remove the stopper plate from the main base by removing the screw (1).
2. Mount the stopper plate on the main base with the screw (1) in such a way that the boss (A) will match the hole (A)'.

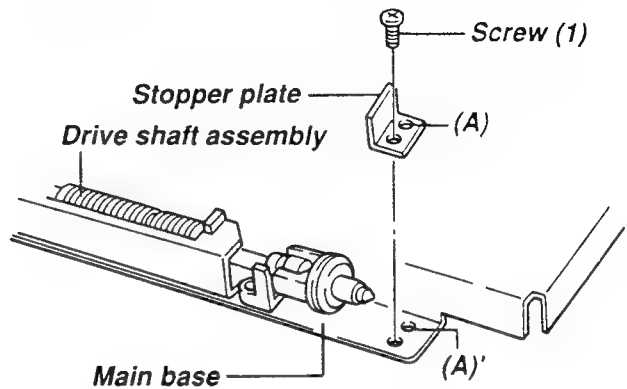


Fig. 4-5-1 Stopper plate replacement

1-4-8. Idle Arm Kick Lever Replacement

1. Remove the front loading assembly, or move the cassette holder down to the loading position by turning the loading motor without inserting the cassette.
2. Pull the idle arm assembly up by turning it in the direction of the arrow (A) and pushing its claw (1) with tweezers, etc. in the direction of the arrow (B).
3. Install a new idle arm kick lever by reversing above procedures.

Note:

- Install the idle arm kick lever so that the (C) section may properly engage the (D) section of the idle arm assembly.

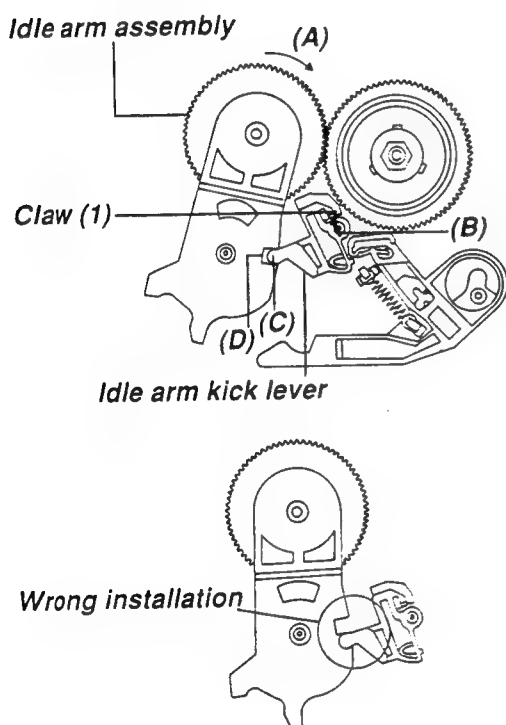


Fig. 4-8-1

1-4-9. S-soft Brake Replacement

1. Remove the S-soft brake spring from the hook (3) of the S-slider lock lever and the hook (2) of the S-soft brake.
2. To remove, move the claw (1) of the S-soft brake with tweezers, etc. in the direction shown by the arrow (C), pull the S-soft brake up and turn it in the direction of the arrow (B).
3. Mount a new S-soft brake by reversing the above procedures.

Note:

- When installing the S-soft brake, insert the boss (A)' of the S-soft brake into the cam groove (A) of the cam gear.
- Before the S-soft brake lever is attached, the S-slider lock lever should be turned in the direction of the arrow (D).
- Take care not to stretch the hook of the S-soft brake spring.

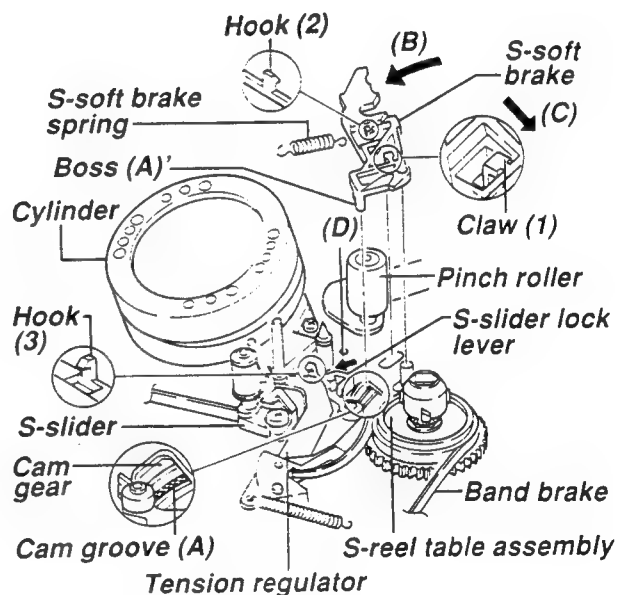


Fig. 4-9-1 S-soft brake replacement

1-4-10. S-slider Lock Replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-soft Brake Replacement").
2. Remove the tension regulator assembly. (Refer to item "1-4-26. (1) Tension Regulator Assembly Replacement".)
3. Turn the drive shaft pulley in the direction of the arrow(A) and move the S-slider from the S-slider lock in the direction of the arrow (B) (Refer to Fig. 4-10-2 A and B.)
4. Remove the S-slider lock by turning it in the direction of the arrow (C) and moving the claw (1) in the direction of the arrow (D).
5. Mount a new S-slider lock in the reverse order of removal.

Note:

- After completion of the replacement, put the S-slider back in its place where it was.

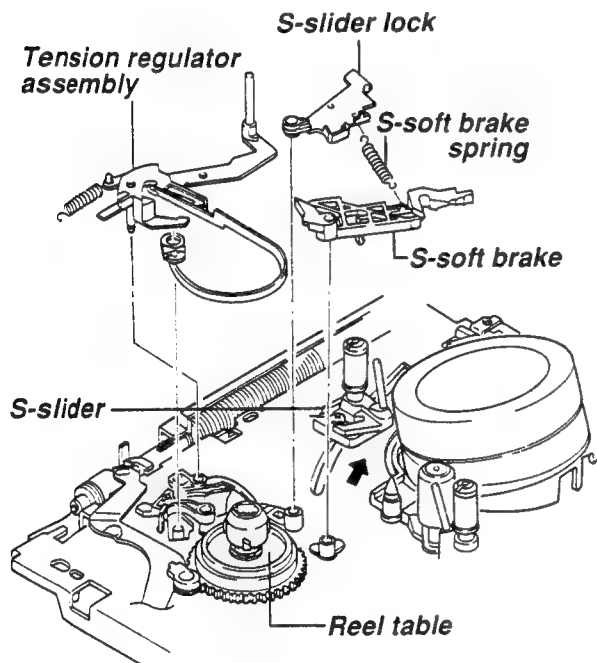


Fig. 4-10-1

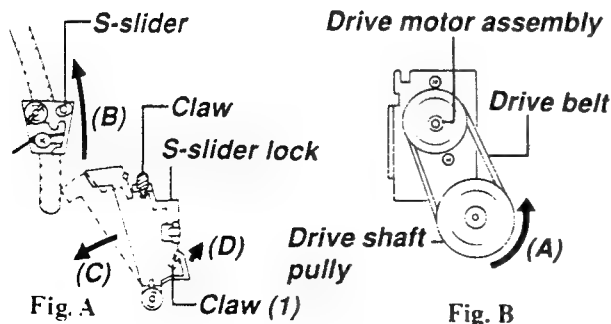


Fig. 4-10-2

1-4-11. T-soft Brake Replacement

1. Remove the T-soft brake spring from the hook (2) of the main base.
2. Move the claw (3) of the T-soft brake in the direction of the arrow and remove the T-soft brake upward.
3. Remove the T-soft brake spring from the T-soft brake.
4. Mount a new T-soft brake by reversing above procedures.

Note:

- When mounting the T-soft brake spring on the T-soft brake, attach the opening side (1)' of the hook to hole (1) so that the opening will face upward.
- Take care in replacement not to touch the brake pad surface.

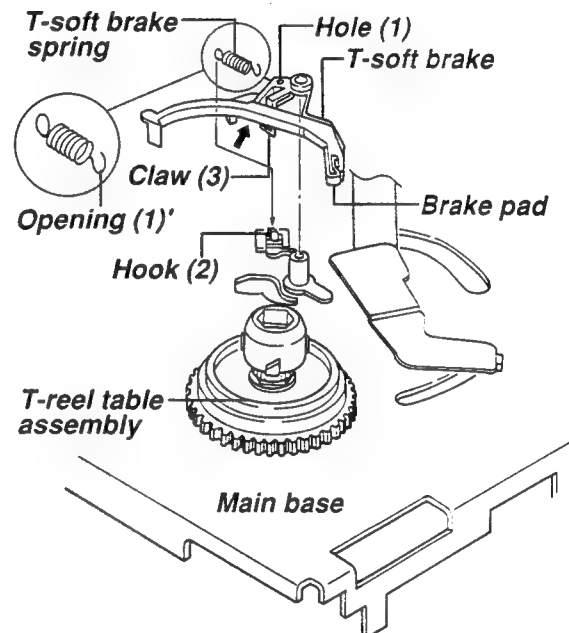


Fig. 4-11-1 T-soft brake replacement

1-4-12. Idle Arm Assembly Replacement

1. Pull up the cap (1) and remove the idle arm assembly upward.
2. Remount a new idle arm assembly so that the protruded part (A) of the idle arm kick lever may fit into the concave part (A) on the idle arm assembly.
3. Mount the cap (1).

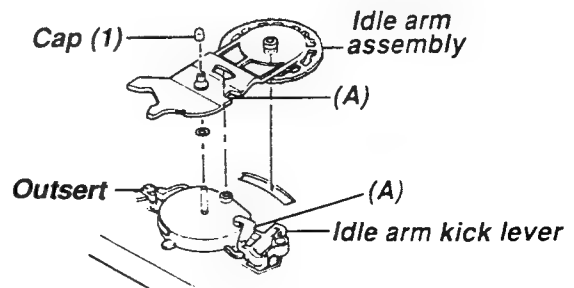


Fig. 4-12-1 Idle arm assembly replacement

1-4-13. S, T-reel Table Replacement

(1) S (Supply) reel table assembly replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-soft Brake Assembly Replacement".)
2. Remove the tension regulator assembly. (Refer to item "1-4-26. (1) Tension regulator assembly replacement".)
3. Remove the stop ring (1) and remove the S-reel table assembly upward.
4. After cleaning the reel shaft with a cleaning kit, lubricate it with one or two drops of oil using lubrication oil kit.
5. Replace the S-reel table assembly in the reverse order of removal.

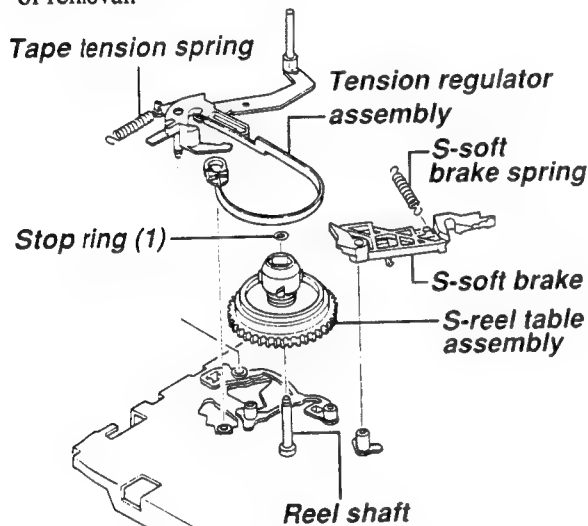


Fig. 4-13-1 Supply reel table assembly replacement

(2) T (Take-up) reel table assembly replacement

1. Remove the T-soft brake. (Refer to item "1-4-11. T-soft Brake Replacement".)
2. Remove the stop ring (1) and remove the T-reel table assembly upward.
3. After cleaning the T-reel shaft with a cleaning kit, apply it with one or two drops of lubrication oil kit. Apply oil also to the base (A) of the T-reel shaft.
4. Replace the T-reel table assembly in the reverse order of removal.

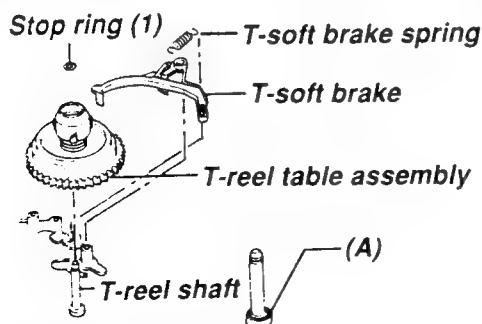


Fig. 4-13-2 Take-up reel table assembly replacement

1-4-14. Clutch System Parts Replacement

(1) Clutch assembly replacement

1. Turn the deck upside down and remove the reel belt.
2. Remove two screws (1) and remove the clutch holder.
3. Remove the clutch assembly upward.
4. Clean the clutch post using the cleaning kit, and then apply one or two drops of lubrication oil kit after confirming that the washer (2) is inserted into the clutch post.
5. When remounting, use the reverse procedures.
6. Check the reel torque, using the torque cassette. (Refer item "1-5-3. Reel Torque Check".)

Note:

- When remounting the clutch assembly on the deck, each protruded part of the clutch assembly, (A) and (B), should match each hole on the main base according to size.
- When remounting, take care the belt is not twisted.
- Do not deform the clutch holder. And, the hole (3) makes to be hooked by the clutch post groove.
- Be sure to insert the washer (2).

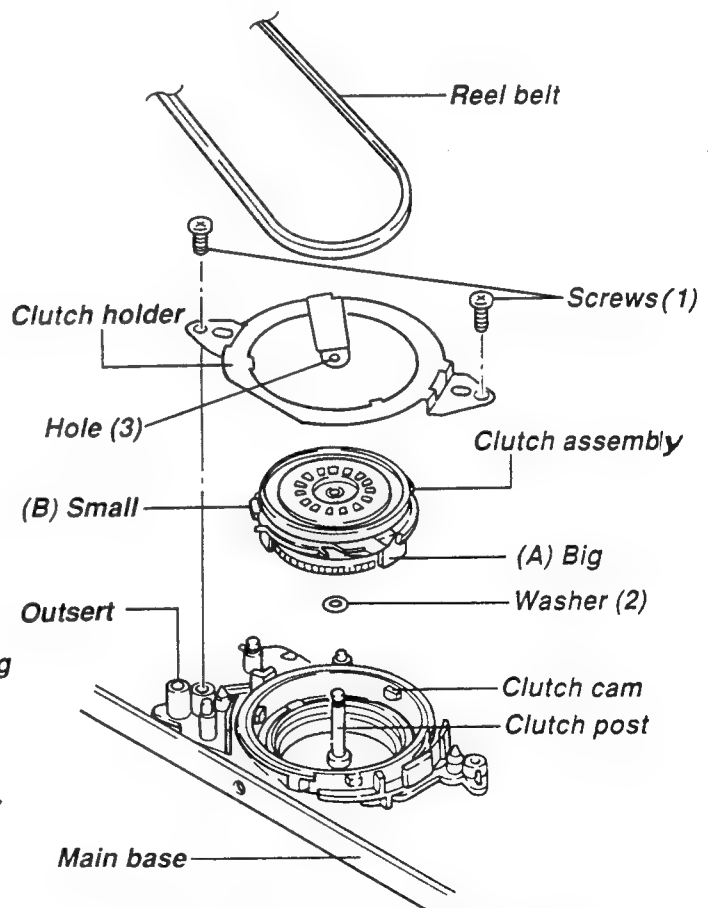


Fig. 4-14-1 Clutch assembly replacement

(2) Clutch cam replacement

1. Turn the deck upside down and remove the reel belt.
2. Remove the clutch assembly according to the replacing procedures. (Refer to item "1-4-14. (1) Clutch assembly replacement".)
3. Remove the clutch cam.
4. Remount a new clutch cam by reversing the removal procedures.
5. When replacing, apply grease to the whole outer surface of three protruded portions (4) of the clutch cam.

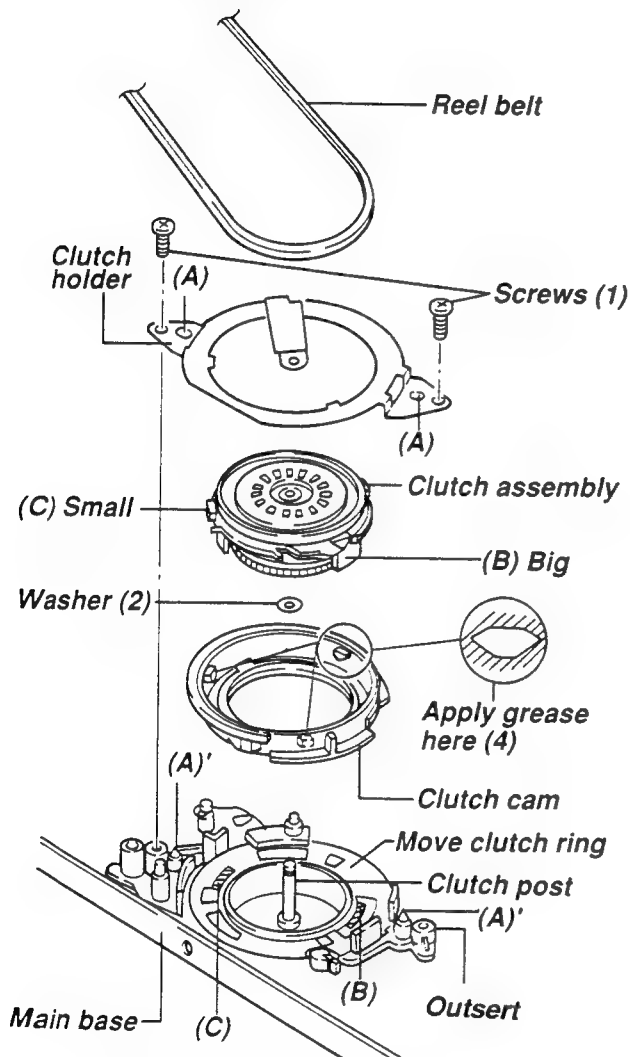


Fig. 4-14-2 Clutch cam replacement

<Clutch cam installation>

(Refer to Fig. 4-14-3.)

Note:

- Check that the move clutch ring has not floated from main base before attaching the clutch cam.
- Move the boss (3) in the direction of the arrow.
- Align the O mark on the gear of the clutch cam and the Δ mark on the cam gear.
- Insert the end of the rec-inhibiting lever between the outset wall and the clutch cam wall.

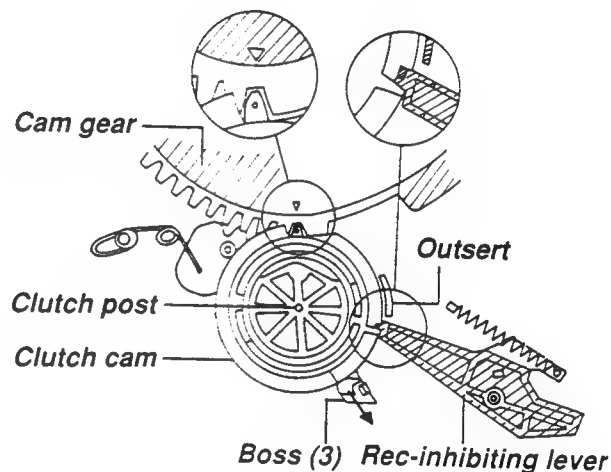


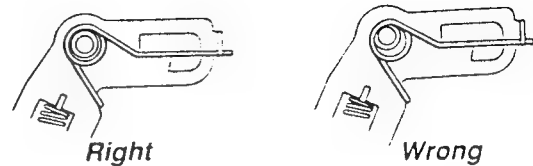
Fig. 4-14-3

1-4-15. Pinch Roller Assembly Replacement

1. Remove the T-soft brake. (Refer to item "1-4-11. T-soft Brake Replacement".)
2. Remove the S-soft brake. (Refer to item "1-4-9. S-soft Brake Replacement".)
3. Turn the main base upside down.
4. Remove the stop ring (1).
5. Place the main base with the right side up.
6. Remove the pinch roller assembly and the pinch torsion spring.
7. Apply grease to a new pinch roller assembly. (Refer to "Apply grease (2)".)
8. Attach the pinch torsion spring to the pinch lever assembly and then slightly insert the shaft of the pinch lever assembly into the sleeve hole (3) on the main base.
9. Remove the pinch lever spring from the hook of the pinch lever assembly, hook it on the post (4). Then, insert the pinch lever assembly deeply into the sleeve and insert the barring (5) into the groove (6) without any clearance.
10. Turn the main base upside down with the pinch lever assembly still held from the right side of the main base.
11. Mount the stop ring on the shaft.
12. Place the main base with the right side up and attach the T and S-soft brakes.

Note:

- When attaching the pinch roller assembly, the pinch torsion spring may detach. At this time, after removing once the pinch roller assembly, put pinch torsion spring again and attach pinch roller again.



- Take care not to touch the pinch roller, or not to soil it.

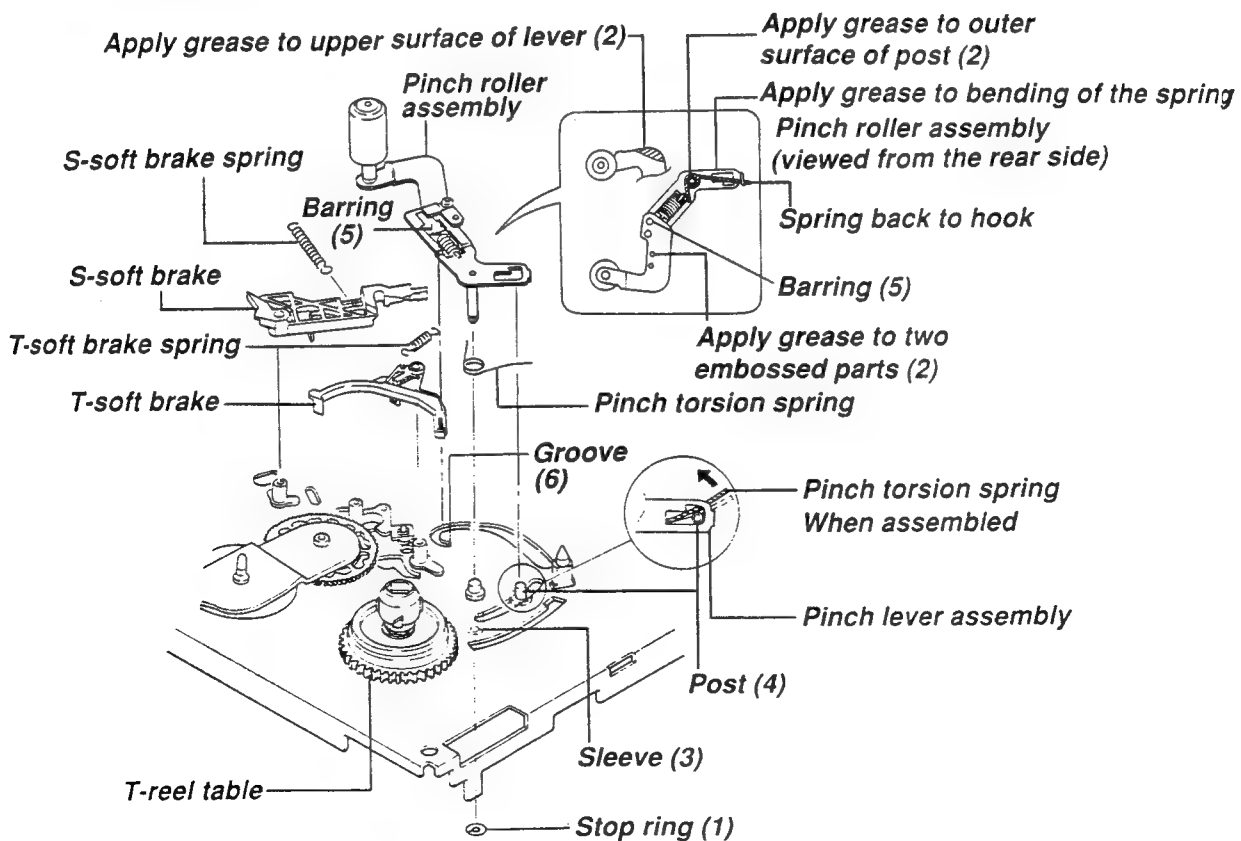


Fig. 4-15-1

1-4-16. Cam Gear Replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-Soft Brake Replacement".)
2. Turn the main base upside-down.
3. Remove the clutch holder, clutch assembly and the clutch cam. (Refer to item "1-4-14. Clutch System Parts Replacement".)
4. Remove stop ring (3) and remove the relay gear.
5. Remove stop ring (1) and remove the cam gear upward by releasing the hook (4).
6. Apply grease to a new cam gear. (Refer to Fig. 4-16-2 "View of cam gear".)
7. Press the T-loading link assembly and the S-loading link assembly in the direction of the arrows (A) and (B) respectively.
8. Set the hole (D) on the mode drive slider, hole (E) on the band brake lever and the hole (F) on the P. OSC drive lever, respectively, to each hole on the main base.
9. Press the moving clutch lever in the direction of the arrow (G).
10. Move the claw (1) in the direction of the arrow (C) and mount the cam gear so that the hole (H) on the cam gear can match the hole on the main base.
11. When reassembling, used the removing steps in the reverse order.
12. After completion of the assembly, make sure by turning the loading belt that the cam gear and its peripheral parts can function properly.

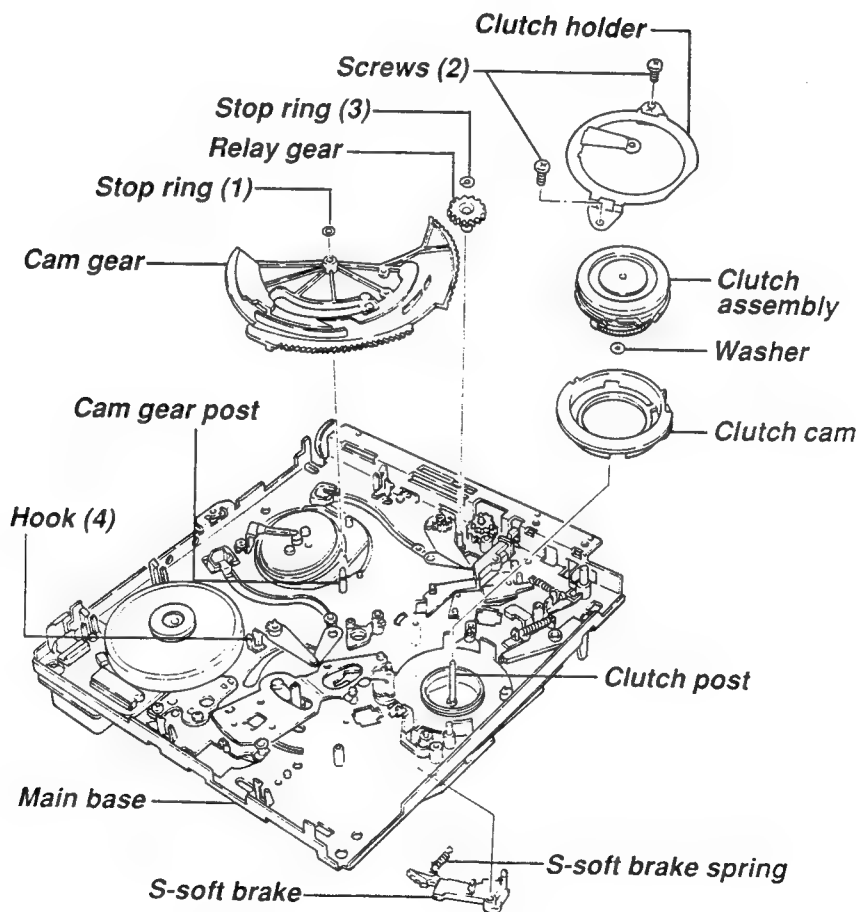


Fig. 4-16-1

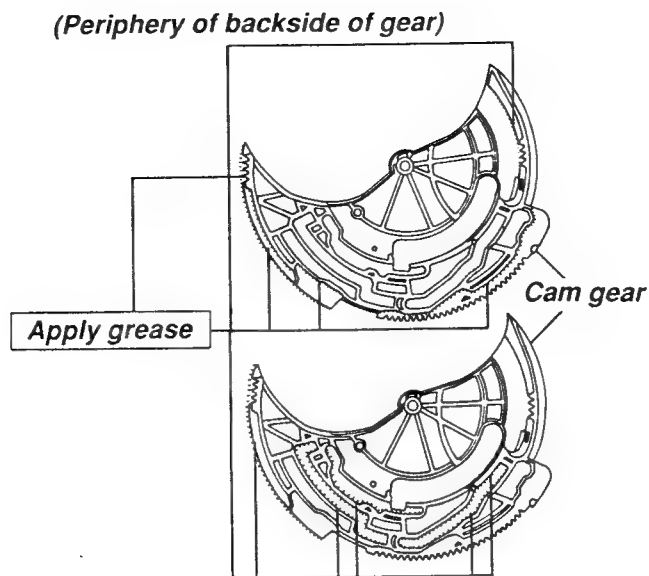


Fig. 4-16-2 View of cam gear

Note:

- The parts enclosed in a square require to perform phase matching with the cam gear.

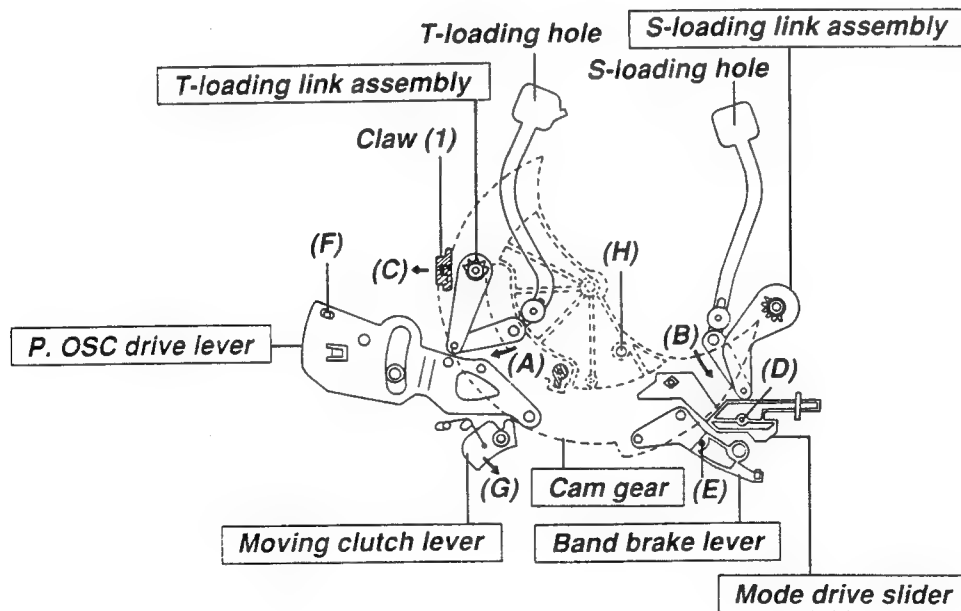


Fig. 4-16-3 Phase matching in assembling the cam gear

1-4-17. P. OSC Drive Lever Replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-Soft Brake Replacement".)
2. Remove the T-soft brake to dismount the pinch roller assembly and the torsion spring. (Refer to item "1-4-15. Pinch Roller Assembly Replacement".)
3. Turn the main base upside-down.
4. Remove the stop ring (1) and remove the relay gear. (Refer to item "1-4-18. Relay Gear Replacement".)
5. Remove the clutch holder, clutch assembly and the clutch cam. (Refer to item "1-4-14. (2) Clutch cam Replacement".)
6. Remove the stop ring (2) and bend the claw (3) in the direction of the arrow (A) to remove the cam gear upward. (Refer to item "1-4-6. Cam Gear Replacement".)
7. Remove the P. OSC drive lever in the direction of the arrow (B).
8. Apply grease to the portion (4) at the new P. OSC drive lever. (Refer to Fig 4-17-2.)
9. Replace the P. OSC drive lever by reversing above procedures. When installing, insert the barring (6) of the P. OSC drive lever into the hole (5) on the main base and also insert the lock plate of the P. OSC drive lever into the hole (7) on the main base in the direction of the arrow (C).

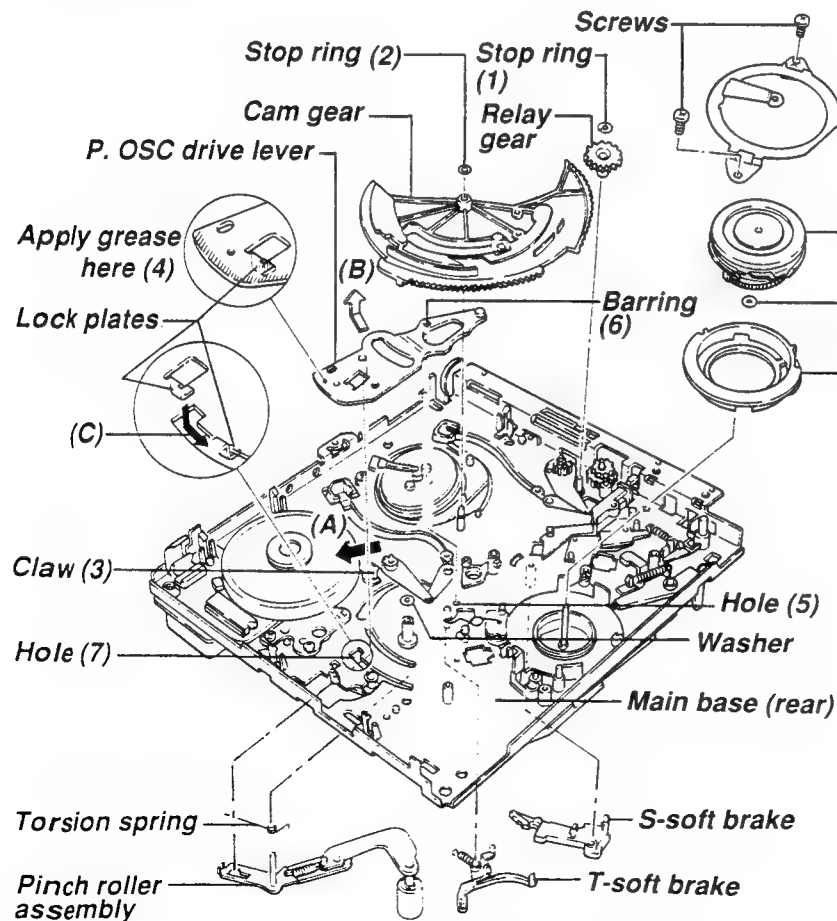


Fig. 4-17-1 P. OSC drive lever replacement

1-4-18. Relay Gear Replacement

1. Remove the stop ring (1) and remove the relay gear upward.
2. Apply grease to the periphery of the gear (two parts) of the new relay gear. Also apply grease to the outer surface of the relay gear post.
3. Remount the relay gear in the reverse order of removal. (Note: Gear phase can be adjusted arbitrarily.)

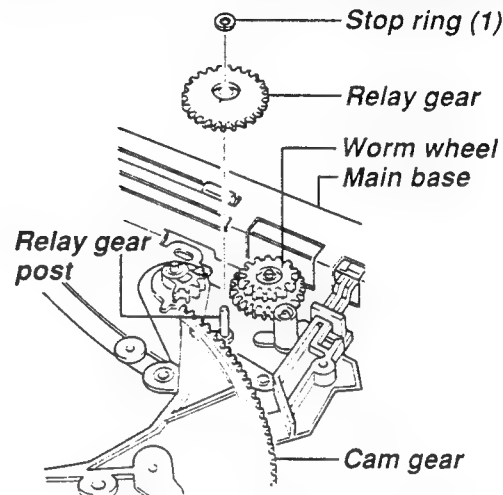


Fig. 4-18-1 Relay gear replacement

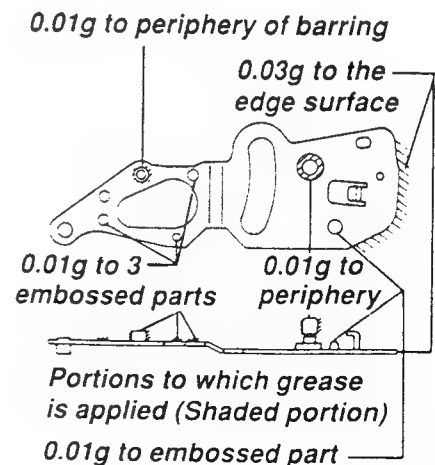


Fig. 4-17-2

1-4-19. S, T-Loading Link Assemblies Replacement

1. Remove the clutch holder, clutch assembly and the clutch cam. (Refer to item "1-4-14. (2) Clutch cam replacement".) In this case, the main base is turned upside-down.
2. Remove the relay gear. (Refer to item "1-4-18. Relay Gear Replacement".)
3. Remove the cam gear. (Refer to item "1-4-16. Cam Gear Replacement".)
4. Place the main base with the right side up.
5. Remove the slider stopper (2) and the torsion spring (4) from the S-slider. (When replacing the T-loading link assembly, remove the slider stopper (3) and the torsion spring (5) from the T-slider.)
6. Turn the main base upside-down.
7. Remove the stop ring (1) and remove the S-loading link assembly. (When replacing the T-loading link assembly, remove the T-loading link assembly.)
8. When remounting, use the reverse procedures.

Note:

- For items 5 to 8., refer to item "1-4-3. (7) S, T-sliders replacement".)

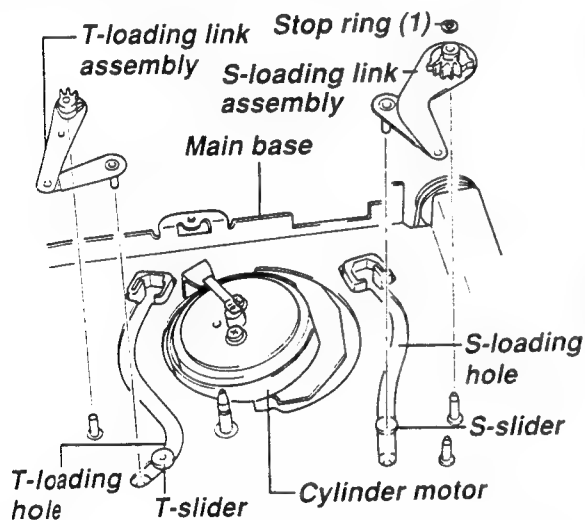


Fig. 4-19-1 T, S-loading link assemblies replacement

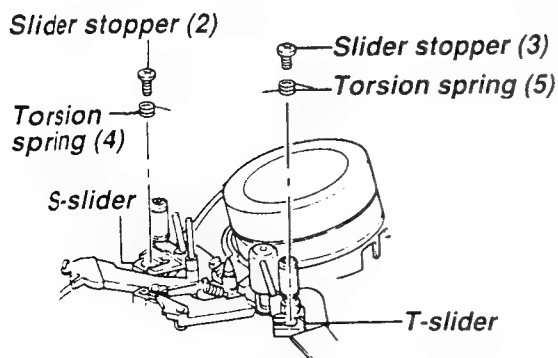


Fig. 4-19-2

1-4-20. Worm Wheel Replacement

1. Remove the S-main brake lever and T-main brake lever assembly and then remove the main brake charge lever. (Refer to item "1-4-7. (2) Main brake charge lever replacement".)
2. Remove the loading belt and then loading motor assembly. (Refer to item "1-4-4. Loading Motor Assembly Replacement".)
3. Remove the drive shaft assembly. (Refer to item "1-4-6. Drive Shaft Assembly Replacement".)
4. Remove the relay gear by detaching the stop ring (2) (Refer to item "1-4-18. Relay Gear Replacement".)
5. Remove the worm wheel by detaching the stop ring (1).
6. Apply grease the outer surface of the gear (2 portions) of the new worm wheel. Also apply grease to the periphery of the gear post.
7. Remount the worm wheel in the reverse order of removal. (Gear phase can be adjusted arbitrarily.)

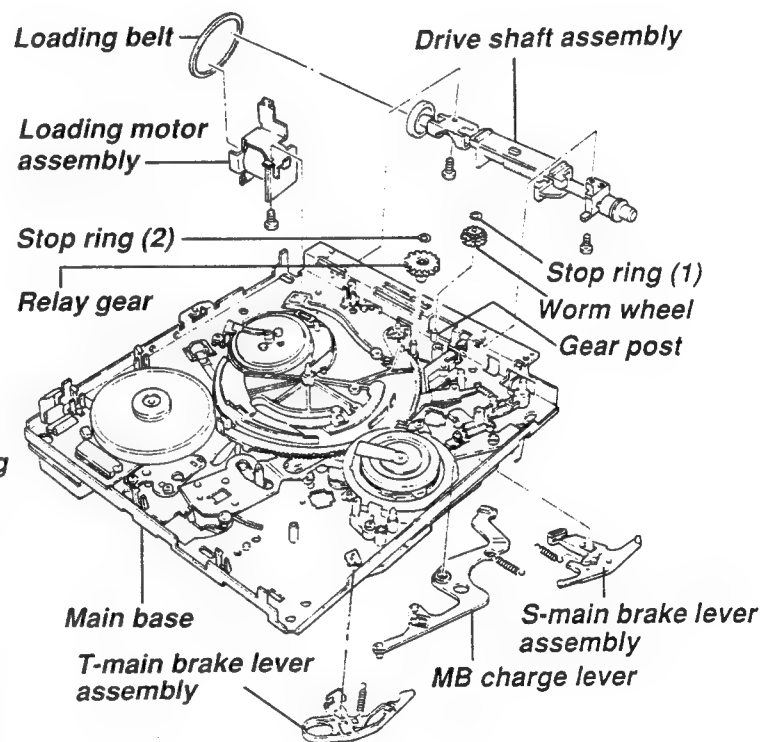


Fig. 4-20-1

1-4-21. OSC Drive Lever Replacement

1. Remove the T-soft brake. (Refer to item "1-4-11. T-Soft Brake Replacement".)
2. Remove the S-soft brake. (Refer to item "1-4-9. S-Soft Brake Replacement".)
3. Remove the pinch roller assembly. (Refer to item "1-4-15. Pinch Roller Assembly Replacement".)
4. Remove the OSC guide lever assembly and the torsion spring (2) by detaching the nut (1). (Refer to item "1-4-3. (9) OSC guide lever assembly replacement".)
5. Remove the OSC drive lever assembly in the direction of the arrow (B). (Refer to Fig. 4-21-2.)
6. Remount the OSC drive lever in the reverse order of removal.
7. When the OSC guide lever assembly is replaced, perform the OSC guide lever adjustment. (Refer to item 1-5-4 (3) 5))

Note:

- Align the O mark shown by (A)' on the OSC drive lever and the gear (A) at the left end of the OSC lever.

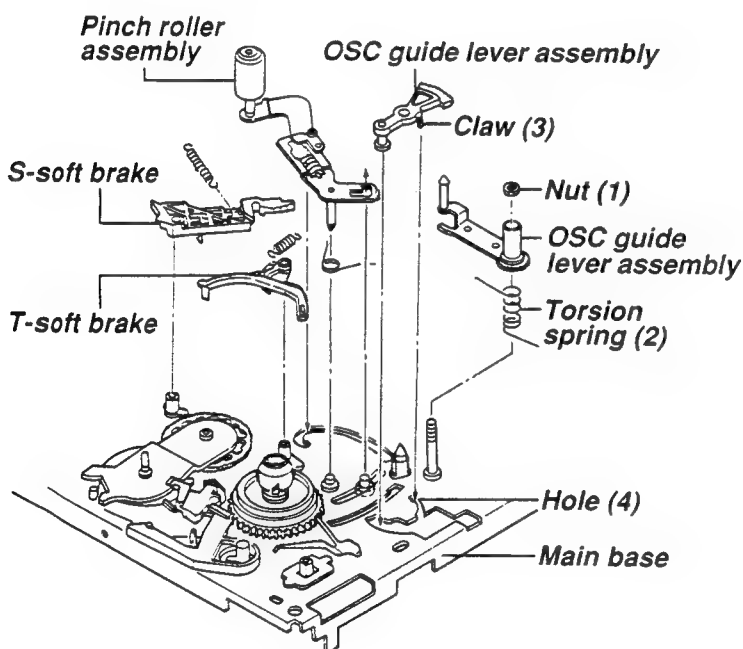


Fig. 4-21-1

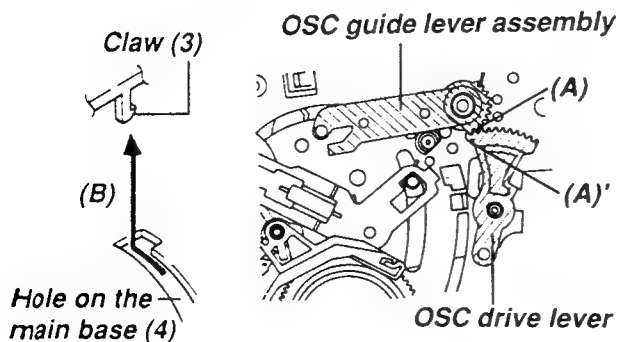


Fig. 4-21-2

Fig. 4-21-3

1-4-22. Band Brake Lever Assembly Replacement

1. Remove the tension regulator assembly, band brake assembly and the band holder as a unit at a time. (Refer to item "1-4-26. (1), (2), (4)".)
2. Turn the deck upside-down and remove the cam gear. (Refer to item "1-4-16. Cam Gear Replacement".)
3. Remove the spring, taking care that the spring is not stretched or deformed. Slide the mode drive slider in the direction of the arrow (A).
4. Energize the tension spring lever in the direction of the arrow (B) and remove the band brake lever assembly.
5. Remount a new band brake lever assembly by reversing above procedures.
6. After all parts are assembled, check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. Check of Tension Pole Position and 1-5-3. Reel Torque Check".)

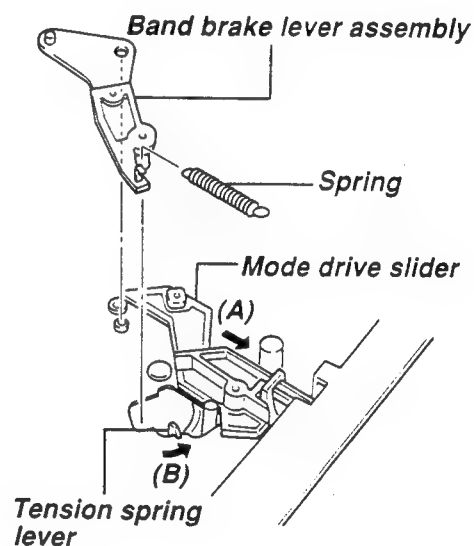


Fig. 4-22-1

1-4-23. Mode Drive Slider Replacement

1. Remove the cam gear. (Refer to item "1-4-16. Cam Gear Replacement".)
2. Remove the band brake lever assembly. (Refer to item "1-4-22. Band Brake Lever Assembly Replacement".)
3. Move the mode drive slider to the left and pull it upward. (Refer to Fig. 4-23-1.)
4. Replace the mode drive slider in the reverse order of removal.

Precautions in the installation: (Refer to Fig. 4-23-2.)

- Make sure that the mode drive slider is gripped in the claw of the outset on the main base. (The band brake lever assembly is attached.)
- Make sure that the mode drive slider is gripped in the claw on the tension spring lever.

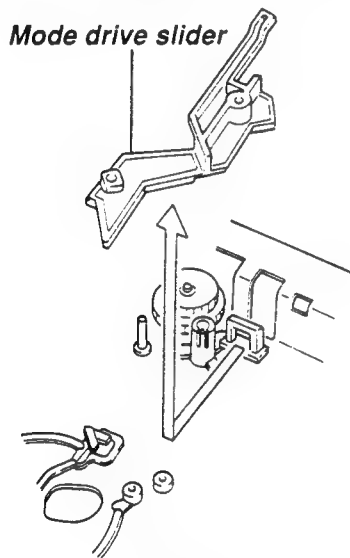


Fig. 4-23-1

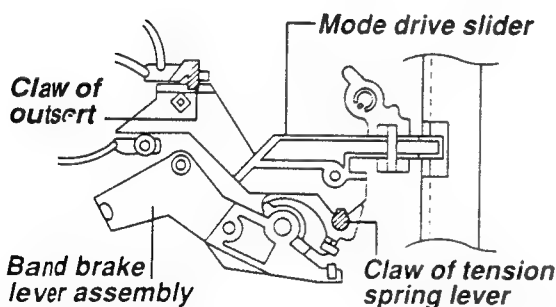


Fig. 4-23-2

1-4-24. Cassette-in Lever Replacement

1. Remove the spring from the hooks of the cassette-in lever and the band brake lever assembly, taking care not to stretch or deform the spring.
2. Off-hook the claw hooked on the main base to remove the cassette-in lever.
3. When remounting the cassette-in lever, use the above steps in reverse order.

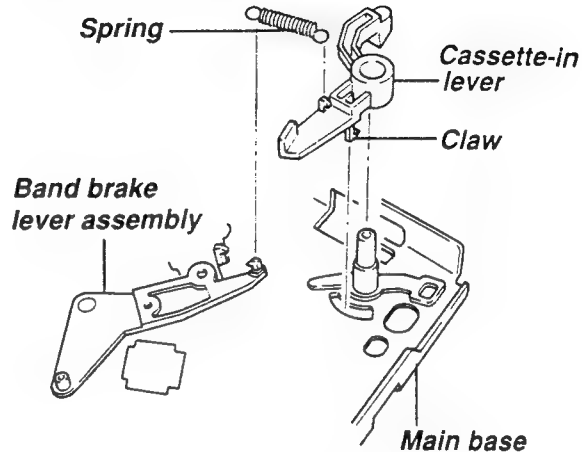


Fig. 4-24-1 Cassette-in lever replacement

1-4-25. Rec-inhibiting Lever Replacement

1. Remove the clutch cam. (Refer to item "1-4-14. (2) Clutch cam replacement".)
2. Remove the spring from the hooks of the main base and the rec-inhibiting lever, taking care not to stretch or deform the spring.
3. Off-hook the claw hooked on the main base and remove the rec-inhibiting lever.
4. Replace the rec-inhibiting lever by reversing above procedures.
5. Install the clutch cam. (Refer to item "1-4-14. (2) Clutch cam replacement".)
6. Reinstall the clutch assembly and clutch holder. (Refer to item "1-4-14. (1) Clutch assembly replacement".)

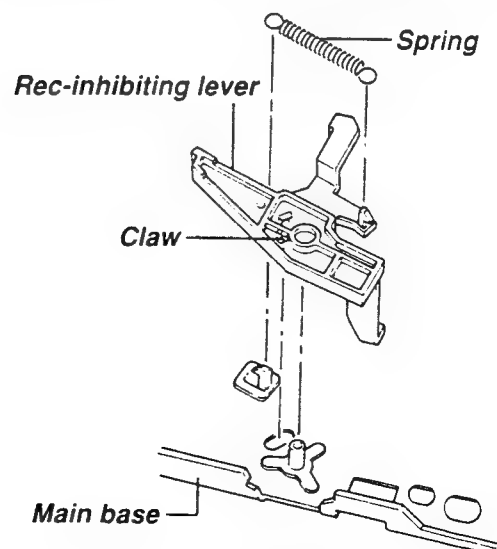


Fig. 4-25-1

1-4-26. Tension Regulator Parts Replacement

(1) Tension regulator assembly replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-soft Brake Replacement".)
2. Remove the tension spring, taking care not to stretch or deform the spring.
3. Off-hook the claw of the outset at the main base hooked on the shaft of the tension regulator assembly and remove the tension regulator assembly upward. Note that the outset hook at the main base is not deformed.
4. Remove the band brake from the hook of the tension regulator assembly. Take care that the felt surface of the band brake is not stained, bent or damaged.
5. Clean the shaft of a new tension regulator assembly and then apply one or two drops of oil. When replacing the tension regulator assembly, perform the previous steps in reverse order. Take care not to apply oil to the tension pole.
6. Check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. Check of Tension Pole Position and 1-5-3. Reel Torque Check".)

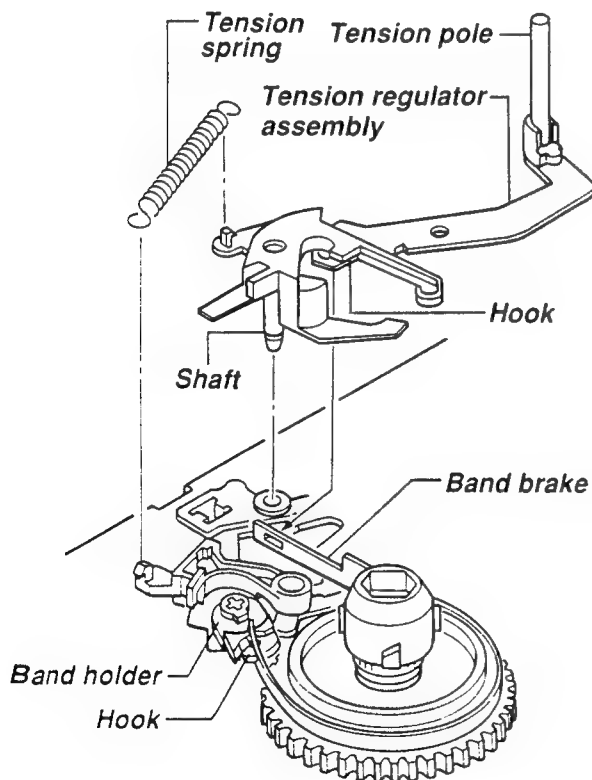


Fig. 4-26-1

(2) Band brake replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-soft Brake Replacement".)
2. Remove the tension regulator. (Refer to item "1-4-26. (1) Tension regulator assembly replacement".)
3. Remove the band brake from the hook of the band holder.

4. When reinstalling a new band brake, perform the previous steps in the reverse order. Take care not to stain or damage the band brake.
5. Check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. Check of Tension Pole Position and 1-5-3. Reel Torque Check".)

(3) Tension spring lever replacement

1. Remove the tension spring, taking care not to stretch or deform the tension lever.
2. Move the tension spring lever close to the portion shown by the arrow (A), off-hook the claw hooked on the main base and then remove the tension spring lever upward.
3. Replace the tension spring lever by reversing above procedures.

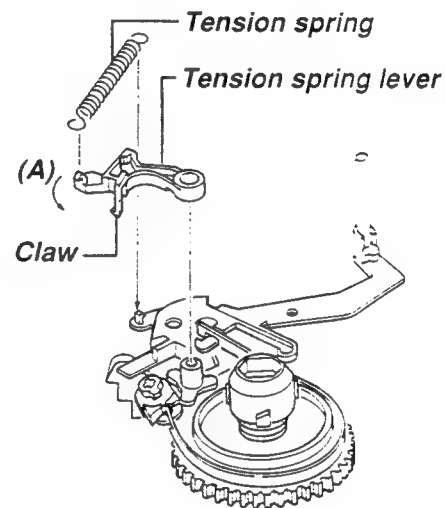


Fig. 4-26-2

(4) Band holder replacement

1. Turn the band holder as shown in Fig. 4-26-3. (so that the protruded part of the band holder nearly matches the hole shape of the band holder.)
2. Remove the band holder upward.
3. Remove the band brake from the hook of the band holder. Take care not to stain, bend or break the band brake.
4. Replace the band holder in the reverse order of removal.
5. Check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. Check of Tension Pole Position and 1-5-3. Reel Torque Check".)

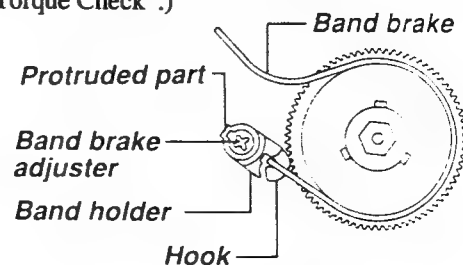


Fig. 4-26-3

1-4-27. Capstan Motor Replacement

1. Remove the FFC (1) for capstan motor and the reel belt (3).
2. Remove the mechanism P. C. board (2) from the rear of the deck. (The screws are not the same, so do not exchange when using.)

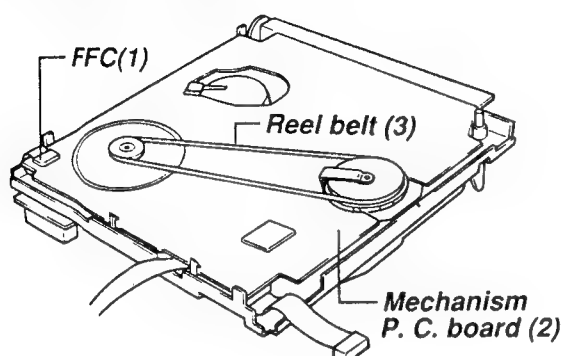


Fig. 4-27-1

3. Remove the FFC (4) from the capstan motor by sliding the connector holder in the direction shown by the arrow.

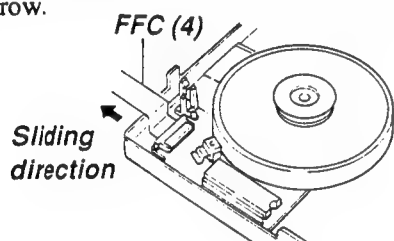


Fig. 4-27-2

4. Hold the capstan motor on the rear of the deck. Remove three screws (5) on the front side of the deck and then remove the motor.

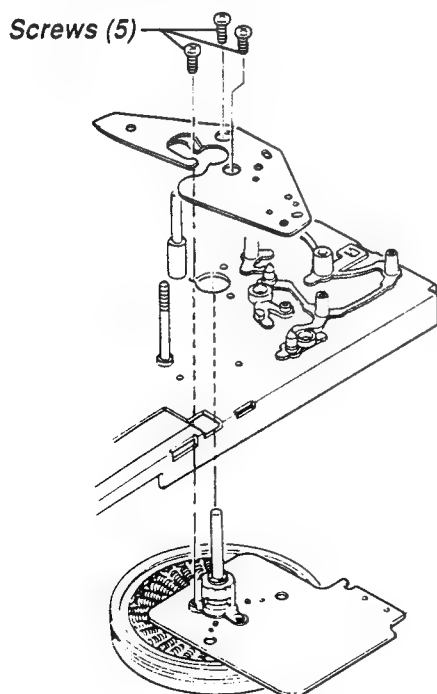


Fig. 4-27-3

5. First, position the capstan motor as shown in the following figure (6) and then mount the motor from the rear side of the deck, taking care not to damage the shaft, motor, etc.

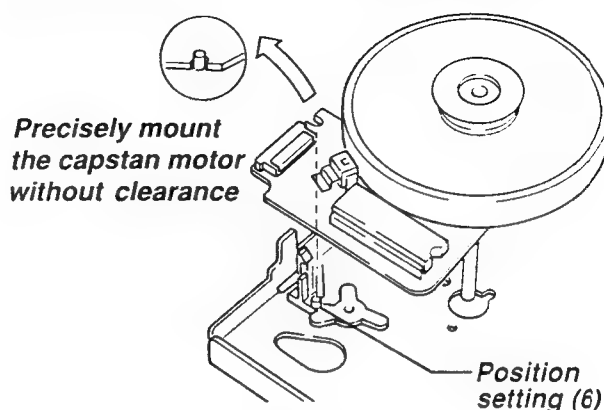


Fig. 4-27-4

6. Next, secure the capstan motor with three screws from the upper side of the deck. (In this case, do not use the screws once removed. Precisely mount the motor without any clearance.)

Clearance not allowed.

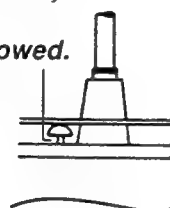


Fig. 4-27-5

7. Connect the FFC to the motor, taking care of its top and bottom side. It should be inserted with the metal terminal side facing downward. Insert the FFC and securely lock the connector by moving it as shown by the arrow.

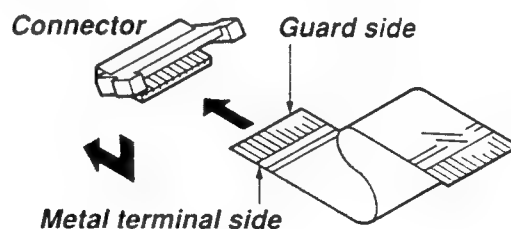


Fig. 4-27-6

8. Hereafter, proceed the remounting, using the removing procedures in the reverse order. When remounting, take care that the capstan motor, reel belt, FFC, etc. are not in contact with each other. Also take care the belt is not twisted and stained with grease.
9. After completion of the capstan motor replacement, check the transport characteristics according to the transport adjustment procedure. (Refer to item "1-5-4 (3) Tape transport system adjustment".)

1-4-28. Ground Brush Replacement

1. Remove the screw (1) and then remove the brush.
2. Clean the ground cap using alcohol.
3. Place the brush so that it can be contact with the center of the ground cap.

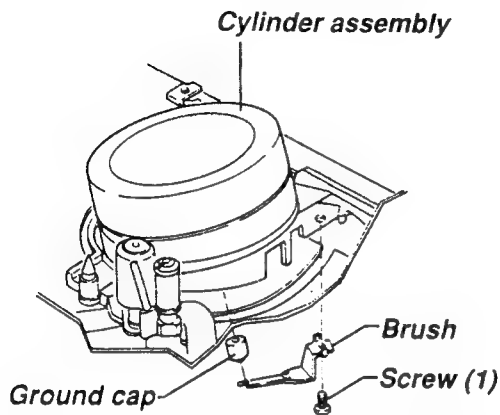


Fig.4-28-1 Ground brush replacement

1-5. Check and Adjustment

1-5-1. How to Check Mechanism Positions

Turning the pulley of the drive shaft assembly allows to move to each position.

Use the position marks of the cam gear and the projection of the main base boss as guideline.

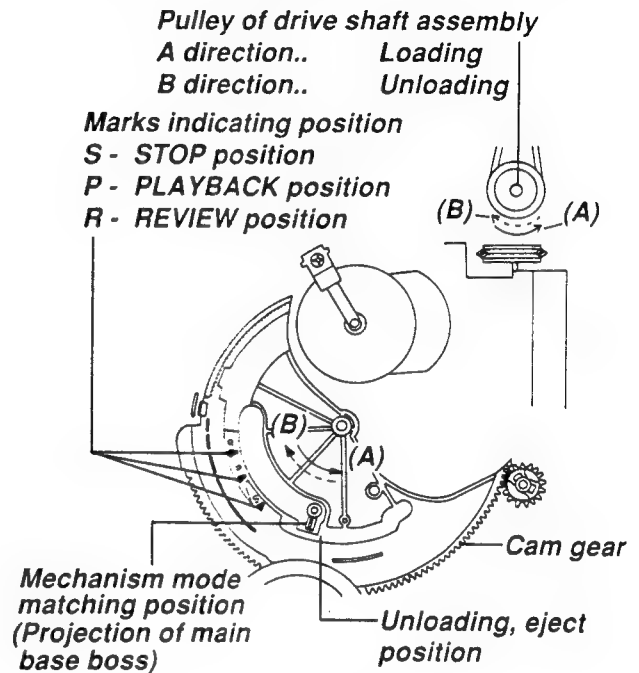


Fig. 5-1-1

1-5-2. Check of Tension Pole Position

1. Check that the protruded part of band brake adjuster has turned to the direction of the lower right.
2. Set the deck to the play mode with the front loading assembly removed. (Shift the mode by referring to item "1-5-1. How to Check Mechanism Positions".)
3. Turn the S-reel table 3 – 4 turns in the clockwise direction.
4. Make sure the peripheral of the outset (shown by shaded arrow) of the tension regulator assembly is $1\text{mm} \pm 0.5\text{mm}$ away from the main base edge as shown in Fig. 5-2-1.
5. If necessary, adjust the position by turning the band brake adjuster in the direction shown by \leftrightarrow . After the adjustment, check to see the tension pole position by turning the S-reel table 3 – 4 turns clockwise.

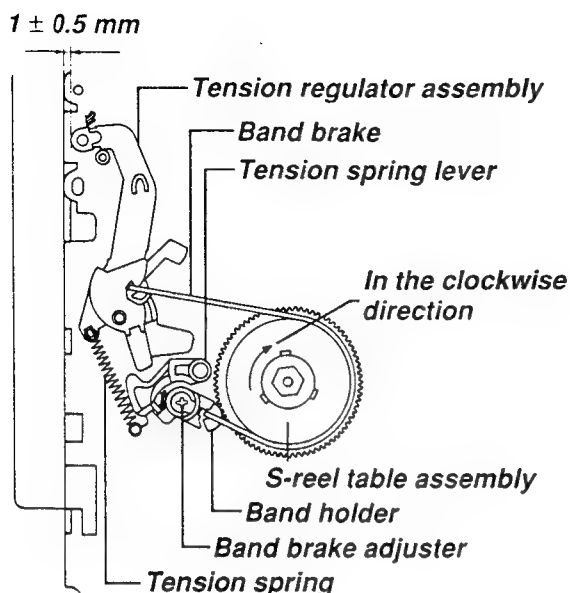


Fig. 5-2-1

1-5-3. Reel Torque Check

(1) Reel torque

1. REVIEW mode
Poor torque may not wind the tape. On the other hand, excessive torque will cause damage to the tape during REVIEW mode.
2. Record/Playback (take-up side) mode
Too little torque does not rewind the tape to the end. If too large torque, the tape may be stretched by excessive tension.
3. Inspection
Rewind the torque cassette (recorded in SP mode) to the end, then check the torque values shown below:

Review	212.5 ± 77.5g-cm
Record/Playback	85 ± 25g-cm

 For checking the method, refer to the following item (2).

(2) Reel torque and back tension check

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR) in the SP mode.
2. Load the torque cassette in the VTR and feed forward the tape before proceeding with measurement.
3. Set the VTR to the REVIEW mode and feed the tape for about 15 sec., and then make sure the take-up torque of 135 – 290g-cm is obtained while observing the left torque meter.
4. After completion of step 3, set the VTR to the PLAY mode and feed the tape for about 30 sec. Read the right torque meter and check the torque of 60 – 110g-cm is obtained.
5. When the review torque and playback torque are out of limit, replace the clutch assembly.

6. When the clutch assembly and the idle gear are replaced, perform the reel torque check.
7. Confirmation and adjustment of the back tension are performed by using a back tension cassette gauge. First, make sure that the tension pole is positioned correctly. (Refer to item "1-5-2. Check of Tension Pole Position".) Load a back tension cassette and set the VTR to the PLAY (SP) mode. Make sure the meter is indicating 30 – 45 gf-cm. If the value is out of limit, first make sure the tension lever spring is normal, and then replace the tension regulator assembly as required. (Refer to item "1-4-26. Tension Regulator Parts Replacement".)

<Precautions for Use of Torque Cassette (KT-300NR)>

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is loaded, confirm followings:
 - Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but bring the tape to its correct position, taking care not to damage the tape.
 - Make sure the tape is not slackened. If slackened, operate the VTR in FF or REV mode and then stop the tape. Then make sure the tape is not slackened again.
 - After above confirmation, proceed to the reel torque adjustments and confirmation.
3. Cautions for removal of torque cassette
 - When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
 - When removing the torque cassette from the VTR, also make sure the tape is not slackened inside the cassette lid before pulling the cassette from the VTR. If the tape is slackened inside the lid, carefully bring the tape in place and then pull the cassette.
4. If the previous precautions 1, 2 and 3 are not performed properly, the tape may be damaged and correct measurements can not be performed.
5. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one. The replacement tape is of E-180, 6.01 ± 0.3m in length.

1-5-4. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

- Noises observed on the screen
- Tape damage
- Parts, shown in the adjustment procedures for the tape system, item 1-4-3. were replaced.

Electrical signal output terminal required for adjustment differs depending upon the models. Refer to the test pin location in the Electrical Adjustment Section.

<Adjustment reference>

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment. To keep height of the No. 8 guide, do not apply excessive force onto the main base to prevent the main base from deformation. In case of adjustment for SP mode only unit, please use SP mode alignment tape (ST-C1) instead of LP mode alignment tape (ST-C3), and adjust finely.

(1) Location of tape transport adjustment

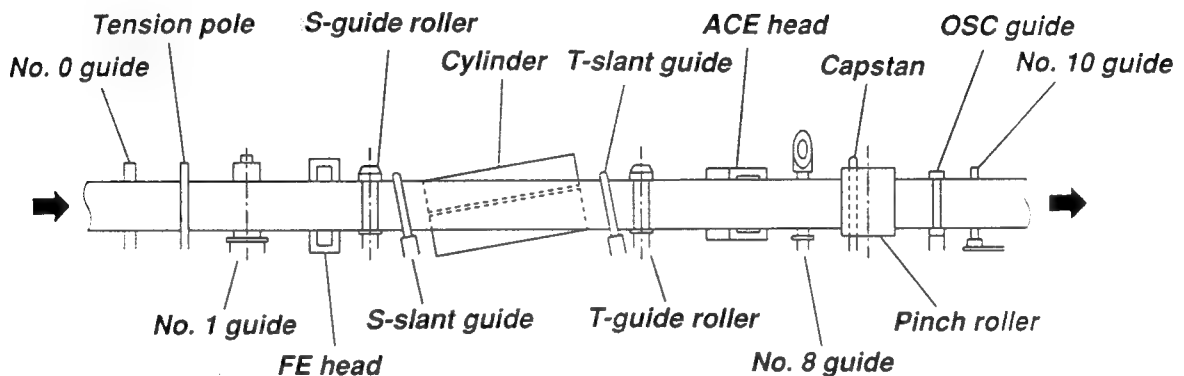


Fig. 5-4-1 Tape travel diagram

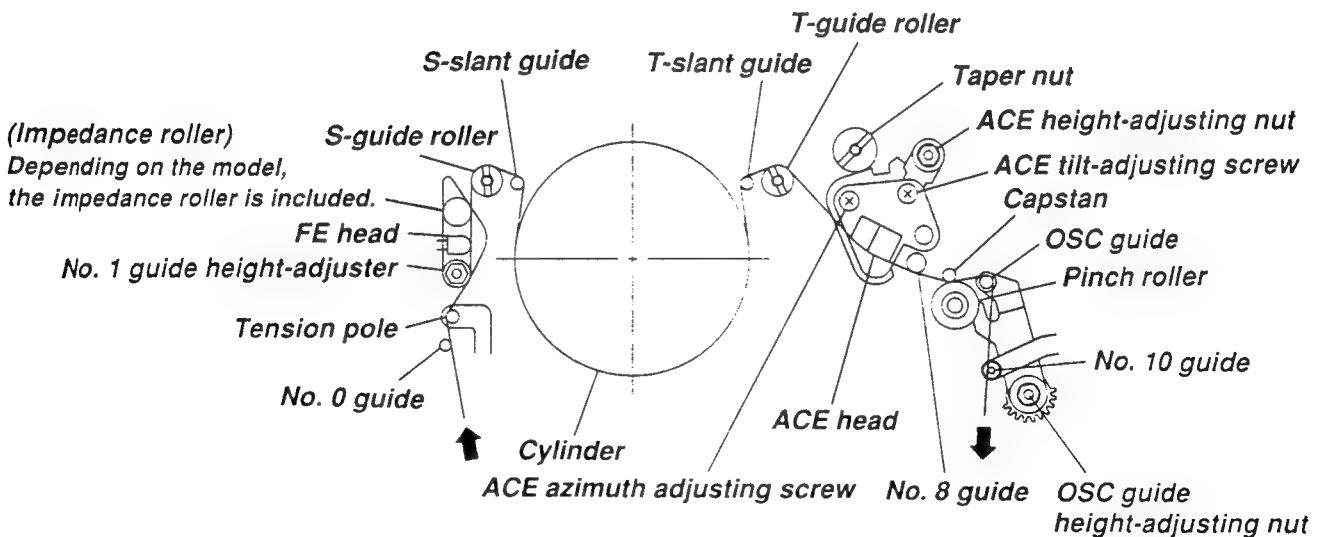
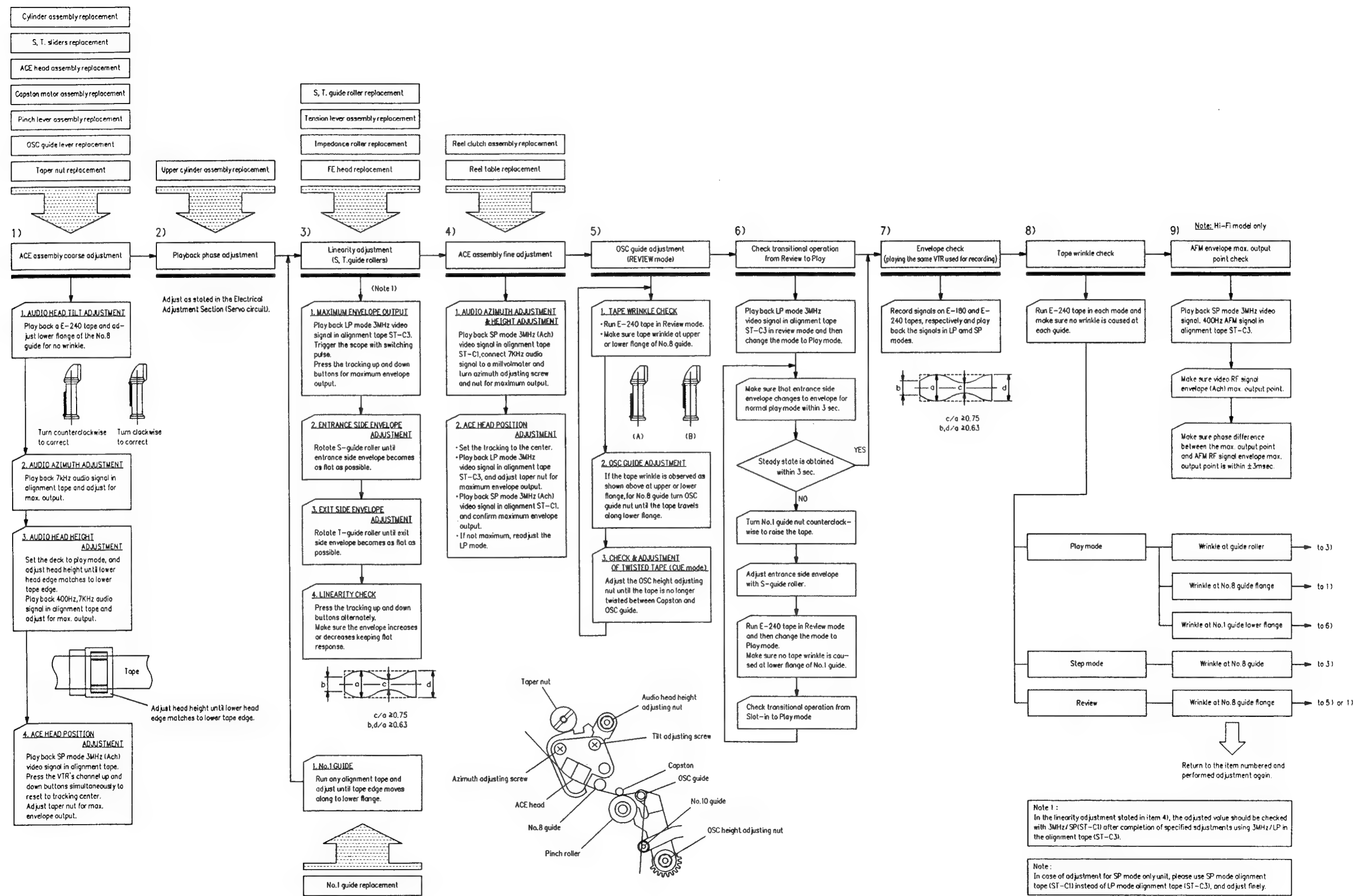


Fig. 5-4-2 Location of tape transport adjustment

(2) Tape transport system adjustment flow chart



(3) Tape transport system adjustment

<Pre-adjustment>

When the part (s) listed in Table 5-4-1 is replaced, perform required adjustments by referring to procedures for the tape transport system. When the part(s) listed in Table 5-4-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the S, T-guide rollers, turn the S, T-guide rollers until wrinkle disappears.
2. If tape wrinkle is observed at the No. 8 guide, perform the tilt adjustment of the ACE head.
3. If tape wrinkle is observed at the OSC guide, perform the OSC guide height adjustment.

<Adjustment procedures>

1) ACE head assembly coarse adjustment

a. ACE tilt adjustment

1. Play back a E-240 tape and observe running condition of the tape at the lower flange of No. 8 guide.
2. Adjust the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 5-4-4 (A).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 5-4-4 (B).

b. Audio azimuth adjustment

1. Play back the 400Hz and 7kHz audio signals on the alignment tape ST-C1 in the SP mode.
2. Connect a millivoltmeter or oscilloscope to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

c. Audio head height adjustment

1. Run the alignment tape (ST-C1) in the playback mode.
2. Observe surface of the audio head using a dental mirror.
3. Turn the ACE height adjusting nut so that lower tape edge matches to the lower edge of the control head.
4. Play back the 400Hz, 7kHz audio signal in the alignment tape (ST-C1) and adjust the head height for maximum audio output.

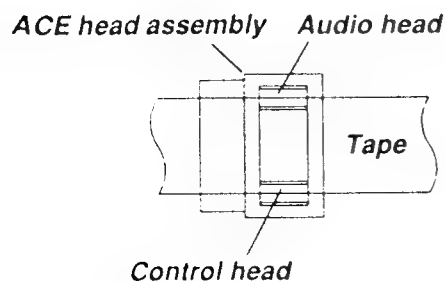


Fig. 5-4-5 Head height

Table 5-4-1

Parts replacement	Adjustment procedure
<ul style="list-style-type: none"> • Cylinder assembly • S, T-sliders • ACE head • Pinch lever assembly • Capstan motor • OSC guide lever assembly • Taper nut 	From item 1)
<ul style="list-style-type: none"> • Upper cylinder 	From item 2)
<ul style="list-style-type: none"> • S, T-guide rollers • Tension lever assembly • FE head • No. 8 guide sleeve • No. 1 guide 	From item 3)
<ul style="list-style-type: none"> • Reel clutch assembly • S, T-reel tables 	From item 4)

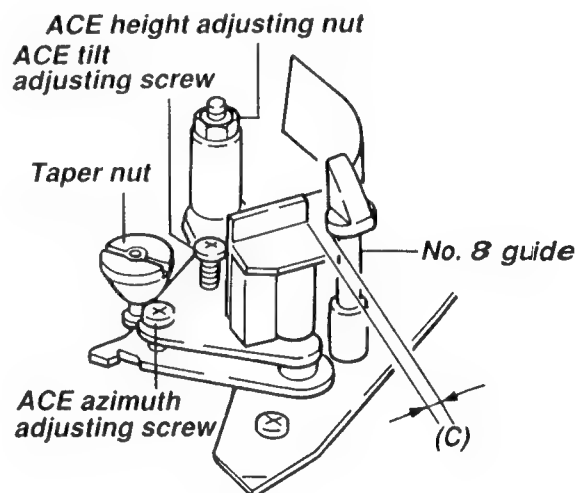


Fig. 5-4-3

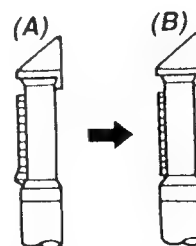


Fig. 5-4-4 Rough check of No. 8 guide

d. ACE head position pre-adjustment

1. Play back the 3MHz video signal in the alignment tape (ST-C1) in the SP mode.
2. Press the VTR's channel up and down buttons to reset to tracking center, and adjust the taper nut for maximum video signal output after the tracking control is set at its center position.

Note:

- Confirm from Fig. 5-4-3 that clearance (C) is provided between the ACE head and No. 8 guide cap as shown in Fig. 5-4-3. (In usual, it is so designed as to leave about 1mm gap.) If there is no clearance, loosen the taper nut and perform the procedure (b) at the position displaced by 1 frame.

2) Playback phase adjustment

Perform the adjustment according to the methods stated in the electrical adjustment (servo circuit).

3) Linearity adjustment

1. Play back the LP mode 3MHz video signal on the alignment tape (ST-C3).
2. Trigger the scope with the switching pulse to issue the envelope signal output.
3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 5-4-6. Again make sure the same by playing back the SP mode 3MHz video signal on the alignment tape ST-C1. If not satisfied, adjust as follows:

Note:

- a = maximum output of the video RF envelope
- b = minimum output of the video RF envelope at the entrance side
- c = minimum output of the video RF envelope at the center point of cylinder

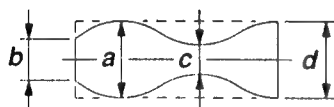


Fig. 5-4-6 Envelope waveform adjustment

- d = minimum output of the video RF envelop at the exit side of cylinder
4. If the (A) section in Fig. 5-4-7 does not meet the specifications, adjust the S-guide roller in up or down direction.

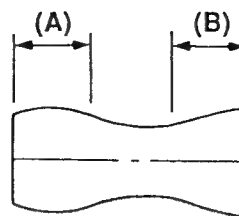


Fig. 5-4-7 Adjustment points

5. If the (B) section in Fig. 5-4-7 does not meet the specifications, adjust T-guide roller in up or down direction.
6. After completion of the adjustment(s), press the tracking up and down buttons and make sure video envelope variations are almost flat. Next, play back the 3MHz SP mode on the alignment tape (ST-C1) and makes the video RF envelope variations are also flat when the tracking buttons are pressed.
7. If the envelope varies as shown in Fig. 5-4-8, adjustment is required again.

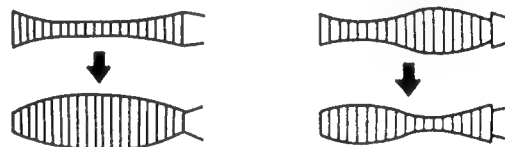


Fig. 5-4-8 Abnormal variation of the waveform

4) ACE head assembly fine adjustment

a. Tape wrinkle check at the lower flange of No. 8 guide

1. Check to see if any wrinkle is observed at the tape between the capstan and the OSC guide. If excessive twist is observed, adjust the OSC guide height until tape is no longer twisted and perform the adjustment 2.
2. If tape wrinkle is observed at the lower flange of No. 8 guide, adjust the ACE tilt adjusting screw counterclockwise as shown in Fig. 5-4-3 until the wrinkle disappears.
3. If a gap is observed between the lower flange of N guide and the lower edge of tape, turn the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:

- This adjustment should be made using a beginning part of E-240 tape.

b. Azimuth adjustment

1. Play back the 400Hz, 7kHz audio signal on the alignment tape (ST-C1).
2. Adjust the ACE azimuth adjusting screw for maximum audio output as shown in Fig. 5-4-3.

c. Audio head height adjustment

1. Play back the alignment tape.
2. Adjust the ACE height adjusting nut for maximum audio output.

d. ACE head position adjustment

1. Play back the LP mode 3MHz envelope on the alignment tape (ST-C3).
2. Press the VTR's channel up and down buttons simultaneously to reset to tracking center.
3. Trigger the oscilloscope with the video switching pulse and observe the video RF envelope waveform.
4. Turn the taper nut and fix the tape nut at the position where the video envelope reaches a peak level.
5. Play back the SP mode 3MHz video signal on the alignment tape (ST-C1).
6. Make sure the envelope output is maximum when the tracking is set to the center.
 - If no envelope output is obtained with the tracking center, again adjust it for maximum envelope output in SP and LP modes. (When envelope output is maximum in the LP mode at the tracking center, difference with the case in the SP mode is within 3msec.)
7. Play back the SP mode 400Hz, 7kHz audio signal on the alignment tape ST-C1 and make sure the audio output is maximum.

5) OSC guide lever adjustment

1. Set the VTR to Cue mode with E-240 tape (at beginning portion) loaded. Switch the Cue mode to the review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide. Adjust the OSC nut in Fig. 5-4-9 so that the tape runs without tape wrinkle.
3. Set the VTR to the Cue mode again and make sure the tape is not twisted between the capstan and the OSC guide. If twisted, adjust the OSC guide height and the adjustment in step 1 again.

Note:

- Previously modify the cassette of E-240 tape for adjusting OSC by removing the lid. First consideration should be given to adjust so that the tape cannot be twisted in the CUE mode.

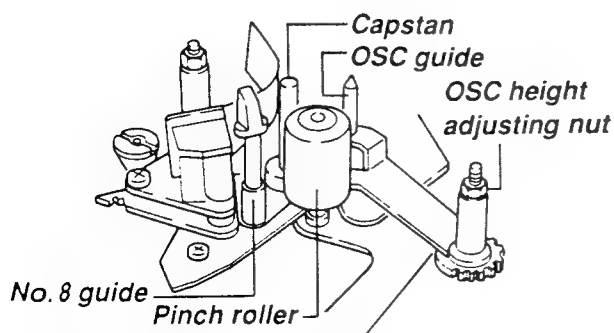


Fig. 5-4-9A OSC guide lever adjustment

6) Check for transitional operation from Review to Play

1. Play back the LP mode 3MHz video signal on the alignment tape ST-C3 in Review mode and observe the video RF envelope with the oscilloscope.
2. Switch the Review mode to the Play mode. When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3 sec. as shown in Fig. 5-4-10. If it does not rise within 3 sec., take the following steps starting 4.
3. Switch the Cassette Slot-In mode to the Play mode. As in item 2., if it does not rise within 3 sec., adjust as follows.

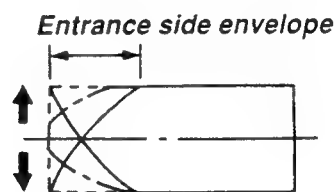


Fig. 5-4-10 Video envelope rising when operation mode is switched from review to play mode

4. Turn the No. 1 guide nut counterclockwise to adjust the lower flange height. Make sure the tape travels along the lower flange.
5. Since entrance side linearity varies as the height of the lower flange of the No. 1 guide is varied, adjust the S-guide roller to correct the linearity.
6. Check above items 2 and 3 to see that the video envelope rises within 3 sec. If not, repeat the adjustment from item 4.
7. Make sure no tape wrinkle is observed at the lower flange in the Play mode and the Review mode. If excessive tape wrinkle occurs, perform the adjustment from item 4 until the wrinkle disappears.

Note:

- If the rising characteristic is poor in Review mode, screen noise may occur in synchronous editing recording. Perform the adjustment carefully.

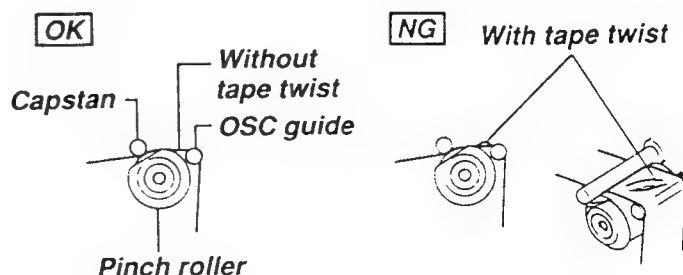


Fig. 5-4-9B Tape twist between Capstan and OSC guide on play & CUE mode

7) Envelope check

1. Make recordings and play back on E-180 and E-240 tapes in SP and LP modes and make sure the playback output envelope meets the specifications shown in Fig. 5-4-6.
2. In playback using the same video deck as used for the recording (with a E-180), the video envelope should meet the specification as shown in Fig. 5-4-11. (Check for both modes, SP and LP.)

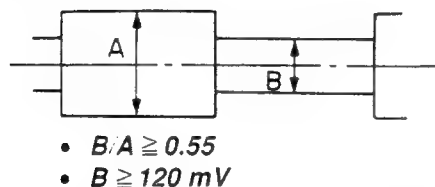


Fig. 5-4-11 Envelope output and output difference

3. If the performance does not meet both specifications above 1 and 2 above, replace the upper cylinder assembly.
4. Set the video to LP mode with the E-180 tape loaded (at the beginning part) and check operation of the synchronous editing recording.
5. If picture noises are observed at the starting position of the editing, again adjust the height of No. 1 guide lower flange.

8) Tape wrinkle check

1. Playback the E-240 tape in the Play mode, CUE mode, Review mode and the frame feeding mode, and check each guide for wrinkle.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below.
 - a. Playback mode
 - Tape wrinkle at the S, T-guide rollers section
 - Item 3) Linearity adjustment
 - Tape wrinkle at No. 8 guide flange
 - Item 1) ACE head assembly coarse adjustment
 - Tape wrinkle at lower flange of No. 1 guide
 - Item 6) Check for transitional operations from Review to Play, and Slot-In to Play
 - b. Review mode
 - Tape wrinkle at No. 8 guide
 - Item 5) OSC guide lever adjustment, or
 - Item 1) ACE head assembly coarse adjustment
 - c. Frame advance mode
 - Tape wrinkle at No. 8 guide
 - Item 3) Linearity adjustment

9) Maximum AFM envelope output point check (Hi-Fi model)

1. Playback the SP mode 3MHz video signal and the 400Hz AFM signal on the alignment tape ST-C3.
2. Trigger the oscilloscope with the video switching pulse, adjust the tracking up and down buttons and check the control pulse phase at the maximum video envelope (Ach) output point.
3. Make sure the control pulse phase difference among each maximum point of AFM envelope, Ach and Bch is within $\pm 3\text{m sec.}$ with the above point used as the basic reference.

Note:

- If the phase difference exceed 3m sec., replace the upper cylinder.

Alignment tape specifications

[1] ST-C1

Segment	System	Playback Time (min.)	Video Signal	Audio Signal	Applications
1	PAL & SECAM	10	Mono Scope	1 kHz	Servo checks and adjustment
2	PAL & SECAM	10	3 MHz Ach	400 Hz	Tape path checks and adjustment
3	PAL	5	Color bar	3 kHz	Video and Sound checks and adjustment
4	SECAM	5	Color bar	3 kHz	Video and Sound checks and adjustment
5	MESECAM	5	Color bar	3 kHz	Video and Sound checks
6	NTSC	5	Color bar	1 kHz	Video and Sound checks

[2] ST-C3

Segment	System	Playback		Video signal	Audio signal	Applications
		Time (min.)	Mode			
1	PAL	5	LP	3 MHz Ach	400 Hz	Tape path check and adjustment
2	PAL	3	LP	Color bar	No signal	Video check and adjustment
3	PAL	3	SP	Color bar	AFM 400 Hz	Video and AFM check and adjustment
4	PAL & SECAM	5	SP	3 MHz Ach	AFM 400 Hz	AFM tracking check
5	SECAM	5	LP	3 MHz Ach	No signal	Tape path check and adjustment
6	SECAM	3	LP	Color bar	No signal	Video check and adjustment
7	SECAM	3	SP	Color bar	AFM 400 Hz	Video and AFM check and adjustment

2. ELECTRICAL ADJUSTMENT

<Test equipment required>

Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmeter
6. Tester (20 k ohm/V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes
Part code: ST-C1: 70909227, ST-C3: 70909264
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator

<Color bar signal>

Color bar signals of 75 % recorded on the alignment tapes are shown in Fig. 2-1-1.

<Specified input and output levels, and impedance>

- Video input: Negative sync, standard composite video signal 1 Vp-p, 75 ohm
- Video output: Same as the video input 1 Vp-p, 75 ohm
- Audio input: -8 dBs, more than 47 k ohm
- Audio output: -8 dBs, less than 4.7 k ohm

Alignment sequence

Proceed the alignments in the sequence as shown in Fig. 2-1-2.

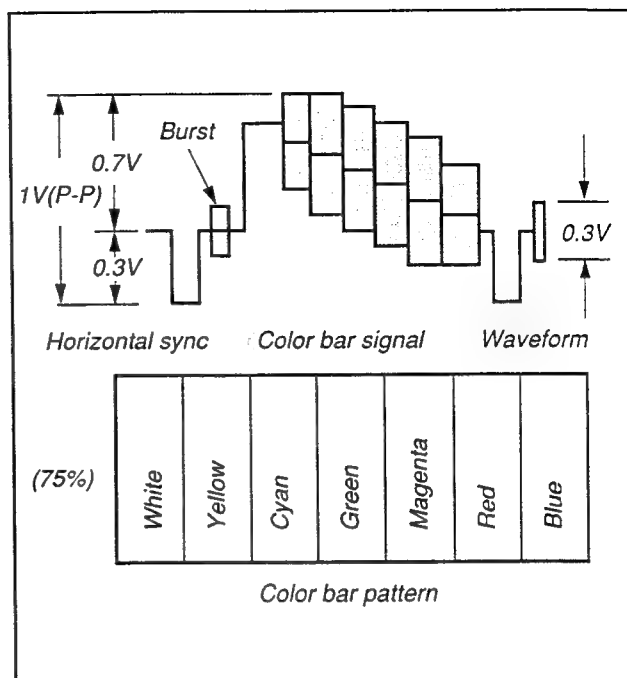


Fig. 2-1-1

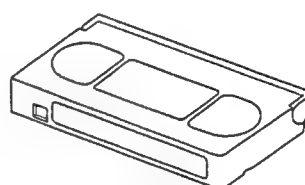
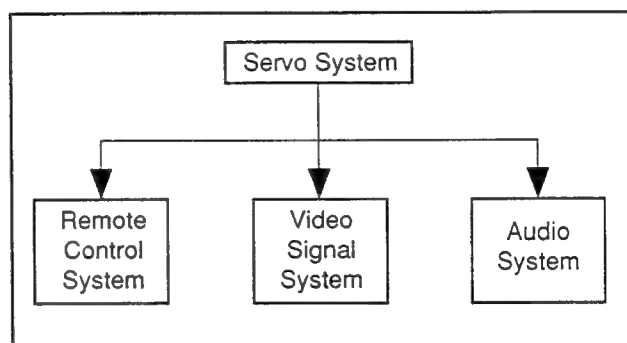


Fig. 2-1-2

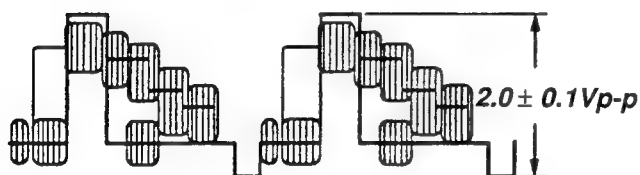
2-2. Video Circuit

2-2-1. EE Level

Test point: TP204
Test equipment: Oscilloscope
Adjusting point: R255

1. Feed the color bar signal to the line input terminal.
2. Set the VTR to the EE mode.
3. Connect the oscilloscope to TP204 and trigger the scope with the composite sync signal at pin 4 of P202. Adjust the scope so that it can display a waveform of approx. 2H.
4. Adjust R255 to obtain 2.0 ± 0.1 Vp-p between the sync tip and 100% white level.

TP204

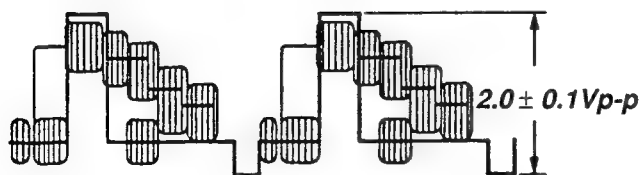


2-2-2. Playback Y Signal Level

Test point: TP204
Test equipment: Oscilloscope
Adjusting point: R256

1. Play back the alignment tape in the SP mode (color bar signal, ST-C1).
2. Connect the oscilloscope to TP204 and trigger the scope with the composite sync signal at pin 4 of P202.
3. Adjust R256 to obtain 2.0 ± 0.1 Vp-p between the sync tip and 100% white level.

TP204



2-2-3. Sync Tip Frequency

Test point: TP201
Test equipment: Frequency counter
Adjusting point: R251

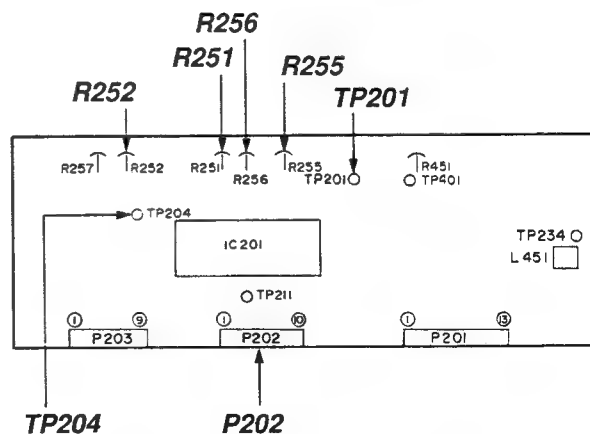
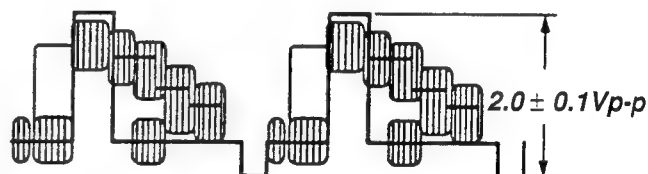
1. Do not feed any signal to the line input terminal.
2. Set the VTR to the record mode.
3. Connect the frequency counter to TP201 and adjust R251 to obtain frequency reading of $3.80 \text{ MHz} \pm 0.10 \text{ MHz}$.

2-2-4. FM Deviation

Test point: TP204
Test equipment: Oscilloscope
Adjusting point: R252

1. Feed the color bar signal to the line input terminal.
2. Connect the oscilloscope to TP204 and trigger the scope with the composite sync signal at pin 4 of P202. Adjust the scope so that it can display a waveform of approx. 2H.
3. Make a recording for 2 – 3 minutes in the SP mode.
4. Play back the tape in the SP mode.
5. Adjust R252 until voltage shows 2.0 ± 0.1 Vp-p while repeating step 3 above.

TP204



Video Control PC Board

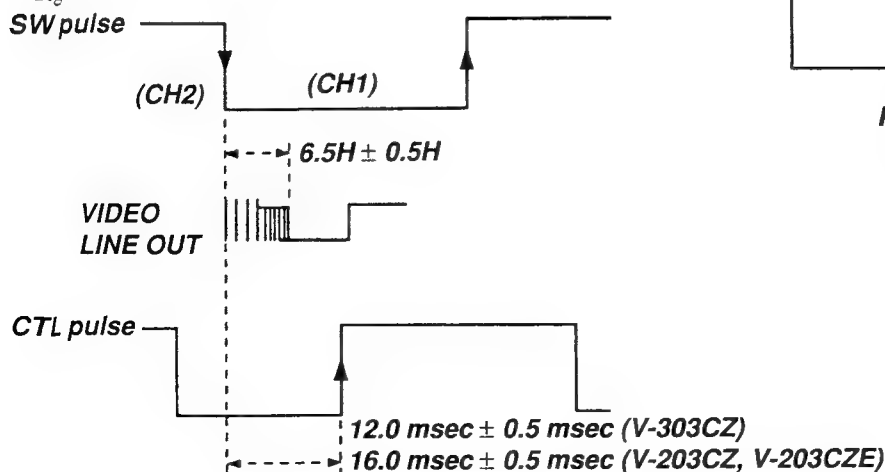
2-1. Servo Circuit

2-1-1. Playback Phase (PG)

Test point: Pin 2 of P506, P790 (video out)

Test equipment: Oscilloscope

1. During playback (ST-C1: color bar signal) press the VTR's channel up button and down button simultaneously to reset to tracking center.
2. At this time confirm that phase difference between the fall of the SW pulse (pin 2 of P506) and the rise of the CTL pulse (pin 1 of P506) is $12.0 \text{ msec} \pm 0.5 \text{ msec}$ (V-303CZ)/ $16.0 \text{ msec} \pm 0.5 \text{ msec}$ (V-203CZ, V-203CZE).
3. Further, observe the envelope (pin 4 of P506) waveform, and confirm that the ACE head position adjustment and linearity adjustment have been made, and, further, confirm that C-SYNC (pin 7 of IC501) is being input during playback.
4. Set the VTR to the STOP mode.
5. Press the unit's channel up and down keys simultaneously for at least 2 seconds.
6. Afterwards, within 2 seconds, simultaneously press the unit's FF and REW keys for at least 2 seconds.
7. Perform the automatic adjustment for about 10 seconds, during this time all the display lights blink. Do not press keys on the unit or remote control unit during this time. If not shifting to automatic adjustment, confirm that the alignment tape is a tape with the safety tabs removed, and redo from 4.
 - ① When adjustment has been completed
After the display light has blinked for 10 seconds, blinking stops, and it returns to the normal display in the STILL mode, then it shifts to playback and the playback indicator is displayed.
 - ② When adjustment fails
It goes into the STOP mode.
8. Confirm that the play indicator is displayed, and confirm that the rising and falling of the SW pulse is $6.5H \pm 0.5H$ from the V-sync front edge of the video signal.



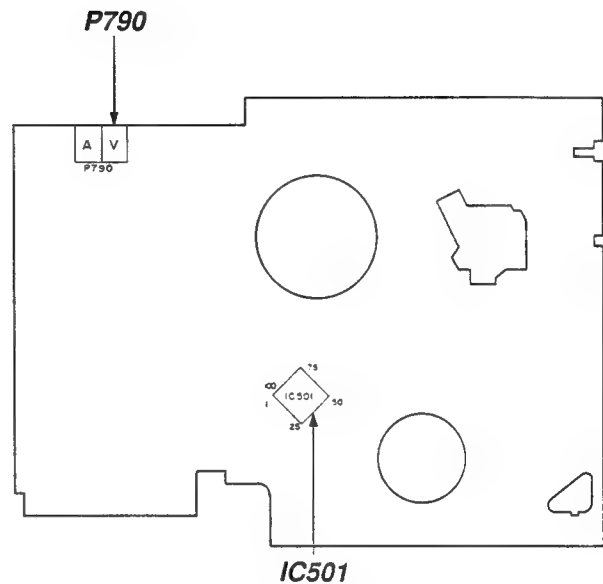
2-1-2. Pseudo V

Test point:

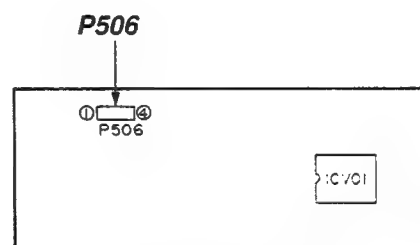
Test equipment: TV monitor

Adjusting point: tracking button

1. Make recordings and playback, and set to the still mode.
2. Using the VTR's channel up and down buttons, adjust the center of the still screen so that it is still.



Main PC Board

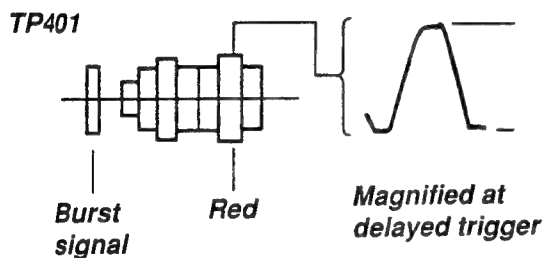


Pre Amp PC Board

2-2-5. Record Color Level

Test point: TP401
Test equipment: Oscilloscope
Adjusting point: R451

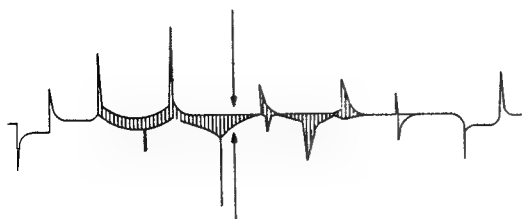
1. Feed color bar signal to the line input terminal.
2. Load a VHS tape and set the VTR to record mode (SP).
3. Connect the oscilloscope to TP401. Trigger the scope with the composite sync signal at pin 4 of P202, and adjust the scope so that can display a waveform of approx. 2H.
4. Adjust R451 until the voltage E shows 220 ± 10 mVp-p. (V-203CZ, V-203CZE)
Adjust R451 until the voltage E shows 130 ± 10 mVp-p. (V-303CZ)



2-2-6. Y Comb Filter Balance

Test point: TP211
Test equipment: Oscilloscope
Adjusting point: R257

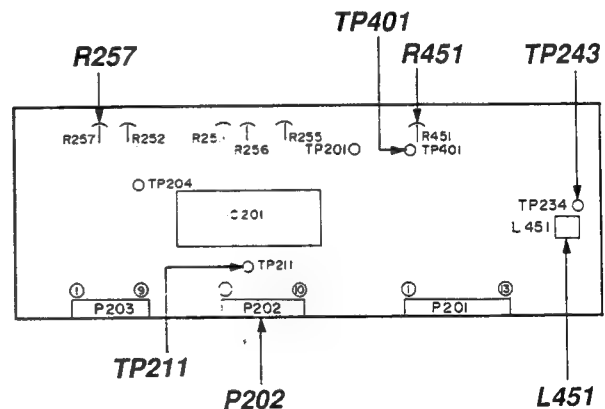
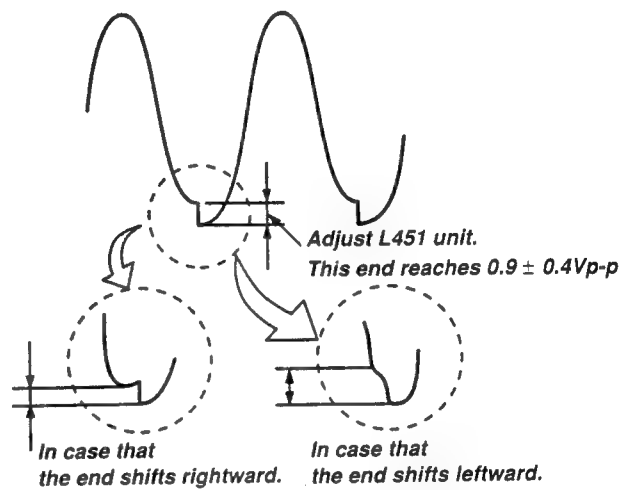
1. Feed color bar signal to the line input terminal.
2. Set the VTR to EE mode.
3. Unsolder the slit beside TP211.
4. Connect the oscilloscope to TP211. Trigger the scope with the composite sync signal at pin 4 of P202 and adjust the scope so that it can display a waveform of approx. 2H.
5. Adjust R257 until the amplitude height shows flat (except spikes).
6. Solder the slit.



2-2-7. SECAM Detection Level

Test point: TP234
Test equipment: Oscilloscope
Adjusting point: L451

1. Feed the SECAM color bar signal to the line input terminal and set the VTR to REC mode.
2. Connect the oscilloscope to TP 234.
3. Adjust L451 until the detector output waveform ends reaches 0.9 ± 0.4 Vp-p.



Video Control PC Board

2-3. Audio Circuit

Unless otherwise specified, set as follows:

- * Input select LINE
- * External input terminal Audio input terminal
- * Connect 47K ohm load to audio output terminal.
- * Perform the head azimuth adjustment and tape transport system adjustment perfectly, and then proceed to the adjustments 2-3-1 to 2-3-3.

2-3-1. Playback Output Level

Test point: Audio line output

Test equipment: Millivoltmeter

Adjusting point: —

1. Connect a millivoltmeter to the audio line output terminal and play back the alignment tape (ST-C1, 1kHz signal).
2. Make sure reading of the millivoltmeter shows $-7.0 \text{ dBs} \pm 2.0 \text{ dB}$.

2-3-2. Bias Current

Test point: P705

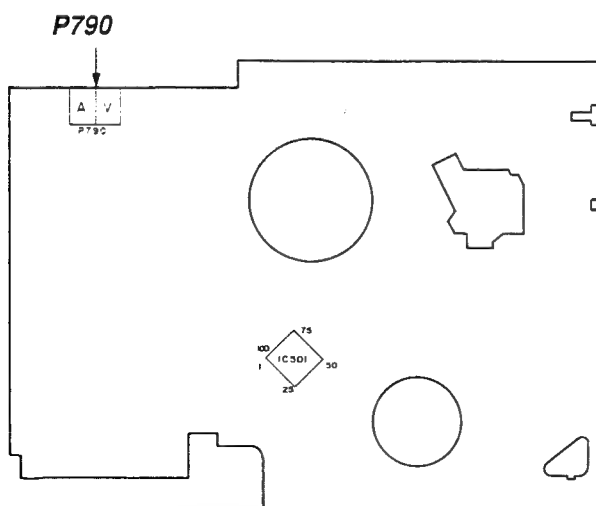
Test equipment: Millivoltmeter

Adjusting point: —

1. Short-circuit the audio line input terminal, creating a no input signal condition.
2. Connect a millivoltmeter to P705, pins 1 and 2 (GND).
3. Set the VTR to the record mode and make sure reading of the millivoltmeter shows $2.9 \pm 0.3 \text{ mV rms}$.

Note:

If the adjusted value is too high, treble tone tends to decrease. If the value is too low, distortion tends to increase.



Main PC Board

2-3-3. Record/Playback Output Level Check

Test point: Audio line output

Test equipment: Millivoltmeter

Adjusting point: —

1. Feed 400 Hz, -8.0 dBs signal to the Audio line input terminal.
2. Connect a millivoltmeter to the Audio line out terminal.
3. Record the signal in SP mode and play back the signal just recorded.
4. Make sure reading of the millivoltmeter shows $-8.0 \text{ dBs} \pm 3 \text{ dB}$.

Note:

When recording audio signals, record a video signal or no signal at the same time.

2-3-4. REC/PLAY Frequency Response Check (SP mode)

Test point: Audio line output

Test equipment: Millivoltmeter

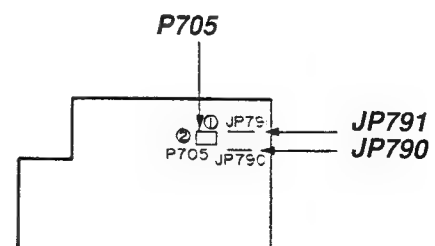
Adjusting point: —

1. Feed -25 dBs , 400 Hz signal to the audio line input terminal and record (SP mode).
2. Feed -25 dBs , 8 kHz signal to the audio line input terminal and record (SP mode).

Note:

When recording audio signals, record a video signal or no signal at the same time.

3. Play back both the signals and check that 8 kHz signal output level should be $0 \pm 5 \text{ dB}$ when compared with 400 Hz output level.
4. When the 8 kHz level is higher than 5 dB from 400 Hz level, cut the jumper wire (JP791-BIAS UP). Or when the 8 kHz level is lower than -6 dB , cut the jumper wire (JP790-BIAS DOWN).



Relay PC Board

SECTION 3

SERVICING DIAGRAMS

1. INSPECTION PROCEDURES

Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. AC Plug-in	Timer setting Program timer setting	Clock display Time setting operation	Power (AC system) Timer	3-11 3-15	3-29 3-33
2. Power SW ON	Timer/counter, SP/LP, Input Select Channel selection. EE picture & tone quality	Mode display lamp TV receive condition. Channel select operation. EE picture & tone quality. Signal level	Power Logic PIF Video (EE, REC mode) Audio (EE, REC mode)	3-11 3-19 3-13 3-25 3-27	3-29 3-34 3-31 3-39 3-47
3. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Cassette-out	F/L mecha. operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-19	3-34
4. Key entry operation Remote-control	REC, PLAY Cue/Review Still FWD/REW	Each mode operation (Tape drive operation) Abnormal sound	Logic	3-19	3-34
5. Special Functions Auto Power ON Alarm Play Meccha. Power off Eject Auto Rewind Tape Remain Indicator Tracking Auto matic play	Cassette-in at Power OFF Loading of tape with tab removed Eject at power off REC/PLAY/CUE "COUNTER/CLOCK/ REMAIN" Cassette-in at power off (without safety tab)	Power ON, Cassette down Auto Play — Completion — REW— completion — Eject — Power OFF Eject — power off Rewind automatically Tape Remain indicator operation. quick remain operation ON/OFF switching Cassette-in — power off	Power Logic/Servo	3-11 3-19	3-29 3-34
6. Playback Function Picture Sharpness Tone Quality Others	PLAY (Test tape: ST-C1) Cue/Review Still	Resolution, S/N, Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter, Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-25 3-27 3-19	3-39 3-47 3-34
7. REC/PLAY Functions Picture Sharpness Tone Quality Others	REC/PLAY	Resolution, S/N, Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter, Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-25 3-27 3-19	3-39 3-47 3-34

How to use the table

1. When unspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.
5. After completion of the repair work, check steps 1 — 7 again.

2. REMOVAL OF THE CABINET

- (1) Disconnect the plug from inlet.
- (2) Remove the two screws ② and a screw ③ securing the top cover ①.
- (3) Slide the top cover ① backward to remove.
- (4) Remove the screw ⑤ securing the bottom cover ④.
- (5) Slide the bottom panel ④ forward to remove.
- (6) Remove the two screws ⑦ securing the front panel ⑥.
- (7) Remove the front panel.

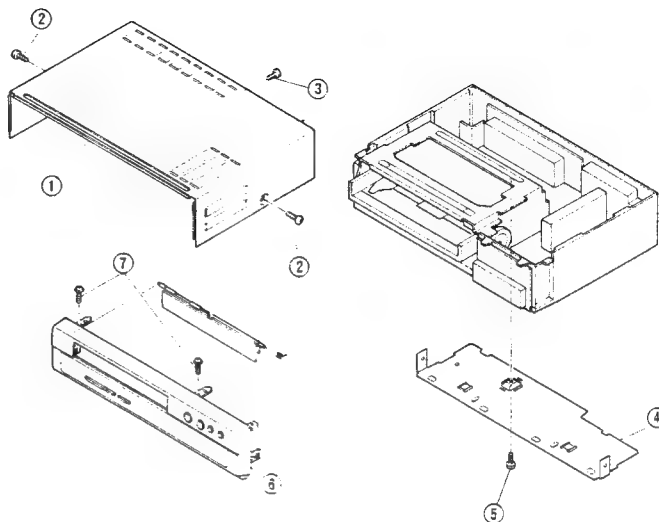
<Note on securing the bottom cover>

Shortage in the screws securing the bottom cover affects the electrical performance.

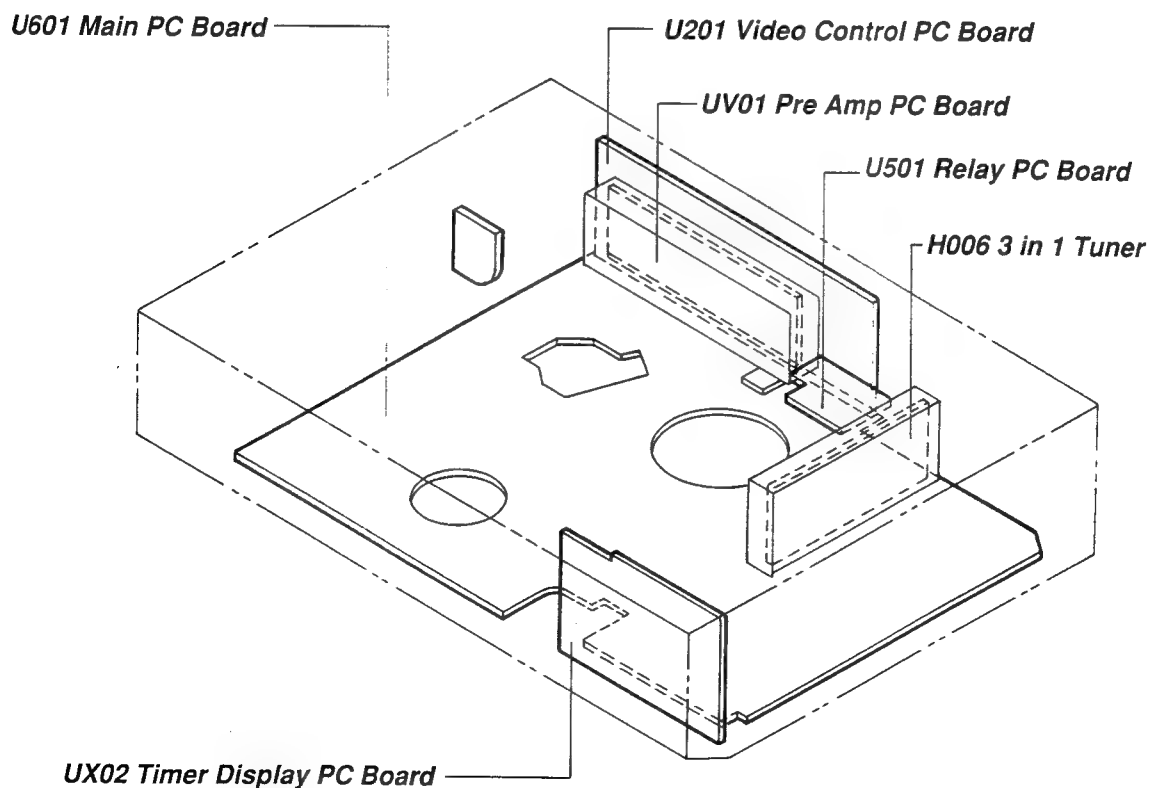
Make sure that screw is fastened to its position after installation of the bottom cover.

< Note on securing the top cover>

When fastening the top cover securing screws ② again, be sure not to apply excessive force. (Less than 6 kg•cm)



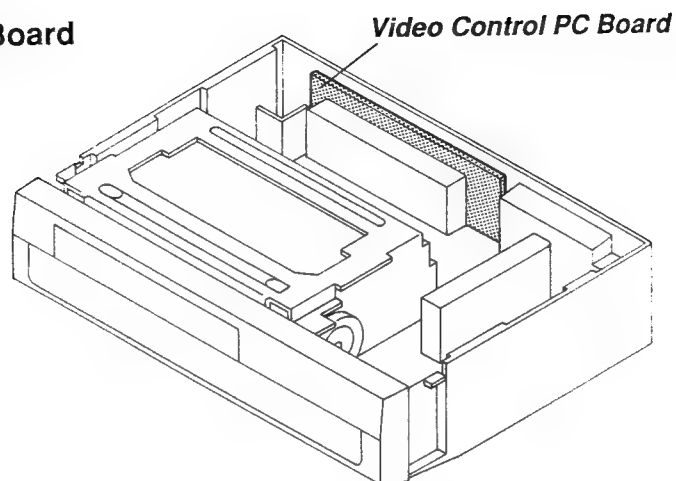
3. LOCATIONS OF ELECTRICAL UNITS



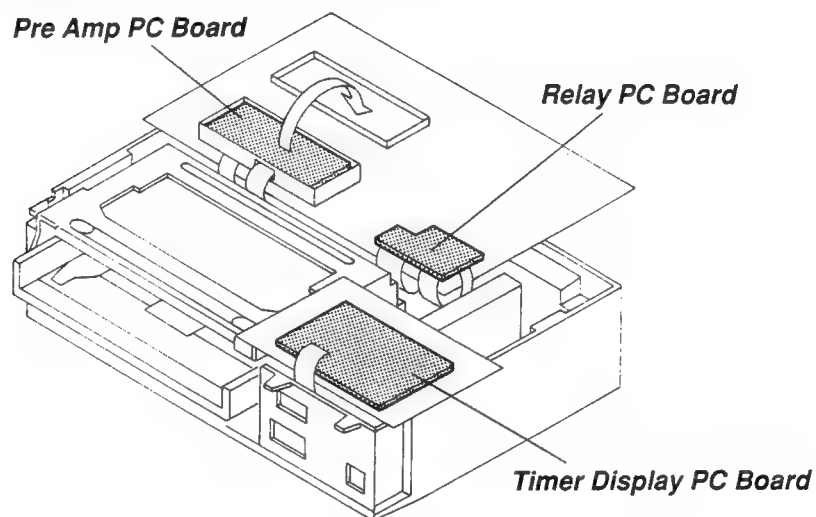
4. PC BOARD SERVICING PROCEDURE

Remove the screws from the respective PC boards. Put each PC board on an insulator

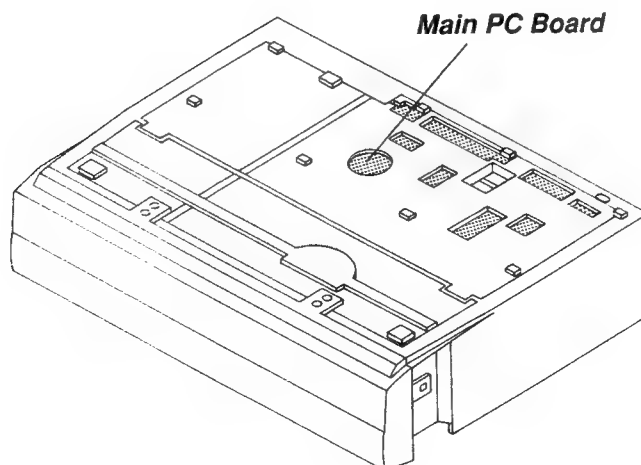
4-1. Video Control PC Board



4-2. Pre Amp PC Board, Relay PC Board, Timer Display PC Board

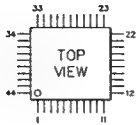

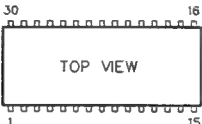

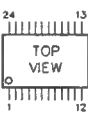

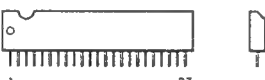
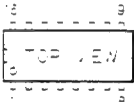



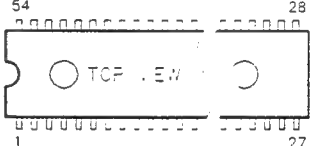
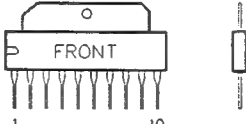
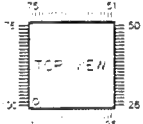
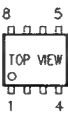
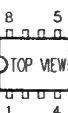


4-3. Main PC Board



5. PART CONFIGURATION AND THEIR SYMBOLS

1. ICs


NAME	SHAPE	NAME	SHAPE
UPD16312		TLP721	
TA8676F		UPC1093J	
TA8789AF		PST523D	
BA7795LS		LA7375ST	
BA7025L		STRD6008Y	
STK5383		TA1202N	
TA7291P		TMP90CK42DF3806Z	
CAT93C46			
TL8839P			

2. TRANSISTORs

2SC1959-Y



NAME	SHAPE
------	-------

PT493F	
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2SA966-Y(C) 2SA1020-Y	
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2SC3422-Y	
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2SC3852	
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RN1401, 2SA1162-Y RN1402, 2SA1362-GR RN1404 RN2402 RN2404 2SC2712-Y	
--	---

XN6501	
--------	---

XN1212	
--------	---

3. DIODEs

1SS136	
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NAME	SHAPE
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AG01	
------	---

1SS131	
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ERA15-02	
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RU2YX	
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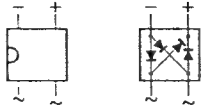

ERA15-06	
----------	---

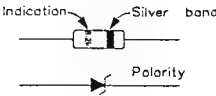
1SS181 1SS184 1SS226	
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MA111 1SS355	
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1SS196	
--------	---

GL451V	
--------	---

NAME	SHAPE
S1WBA60	
02CZ5.1-Y	

NAME	SHAPE
04AZ9.1Z 04AZ33-R	

PRECAUTIONS FOR PART REPLACEMENT

- * In the schematic diagram, parts marked Δ (ex. Δ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- * Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire, etc.

SOLID RESISTOR INDICATION

Resistor	1/6W film	P type film	U type film	Solid	Oxide film	Metal film	Cement	Fuse
Symbol	None	P	U	S	R	W	W	RF

Tolerance	$\pm 2\%$	$\pm 5\%$	$\pm 10\%$	$\pm 20\%$
Symbol	G	J	None	None

- * All film type and oxide film resistors are $\pm 5\%$, so the tolerance symbol was not indicated for them.

CAPACITANCE INDICATION

Description	Symbol	Capacitance, unit	Capacitance allowance
Electrolytic	$\begin{array}{c} \text{+} \\ \text{---} \end{array}$	μF	Not indicated
Special electrolytic			Indicated
Plastic film	$\text{---} \text{---}$	μF : indicated with numbers below decimal point	Indicated below $\pm 5\%$ (J), indicated below $\pm 0.5\text{pF}$, not indicated for others
Ceramic		pF : indicated with numbers over decimal point	
Trimmer	$\text{---} \text{---}$	pF	Not indicated

Note: No working voltage is indicated for capacitors rated at 50V except electrolytic capacitors.

WAVEFORM AND VOLTAGE MEASUREMENT

- * Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.
- * Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.
- * All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

CHIP PART REPLACEMENT

(Use spare part with wire leads connected.)

1. Hold a Chip part to be removed with tweezers and apply heat to the solder at one end of the part with a soldering iron. (Fig. 1)
2. Apply heat to the solder at the other end of the part and remove it.
The heating time should be as short as possible so the excessive heat is not applied to foil patterns and the PC Board.
3. If it is difficult to remove the part, temporarily stop the desoldering job and wait until temperature of the part lowers. Then, repeat steps 1 and 2.
4. Form leads of the replacement part (general part equivalent to the chip part) as shown in the figures and solder place. (Fig. 2)
5. Mount the replacement part so that it does not touch any other parts. (Fig. 3)

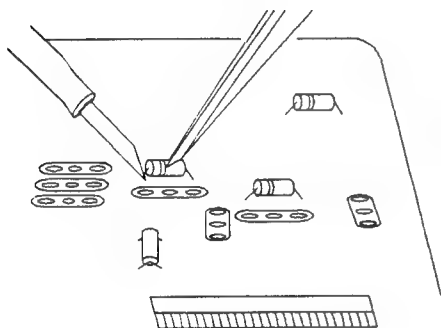


Fig. 1

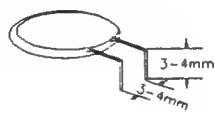


Fig. 2

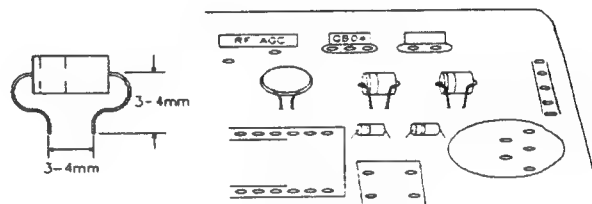


Fig. 3

REPLACING SUBMINIATURE "CHIP" PARTS

1) Required tools:

1. Fine tipped, well insulated soldering "pencil", about 30 Watts.
2. Tweezers
3. Blower type hair dryer.

2) Soldering cautions:

1. Do not apply heat for more than 3 seconds.
2. Avoid using a rubbing stroke when soldering.
3. Discard removed chips; do no reuse them.
4. Supplementary cementing is not required.
5. Use care not to scratch or otherwise damage the chips.

3) Removal (resistors, capacitors, etc.):

1. Melt the solder at one side.

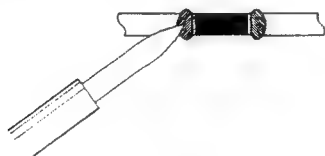


Fig. 1

2. Grasp the part with tweezers and melt the solder at the other side.

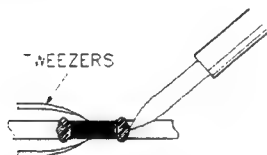


Fig. 2

3. Remove the part with a twisting motion.

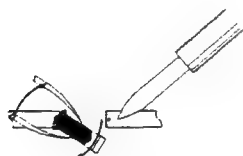


Fig. 3

4) Removal (transistors, diodes, etc.):

1. Melt the solder of one lead.

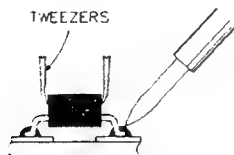


Fig. 4

2. Lift the side of that lead upward.

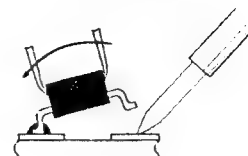


Fig. 5

3. Simultaneously heat solder the two remaining leads and lift part to remove.

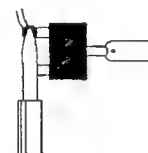


Fig. 6

5) Preheating (except for semiconductors):

Immediately before installing new resistors or capacitors, use a blower type hair dryer and preheat the part for about two minutes at approximately 150°C.

6) Replacement:

1. Presolder the contact points of the circuit pattern.

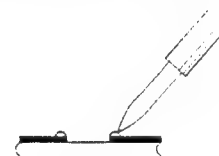


Fig. 7

2. Press the part downward with tweezers and apply the soldering pencil as indicated in the figure.

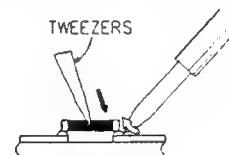
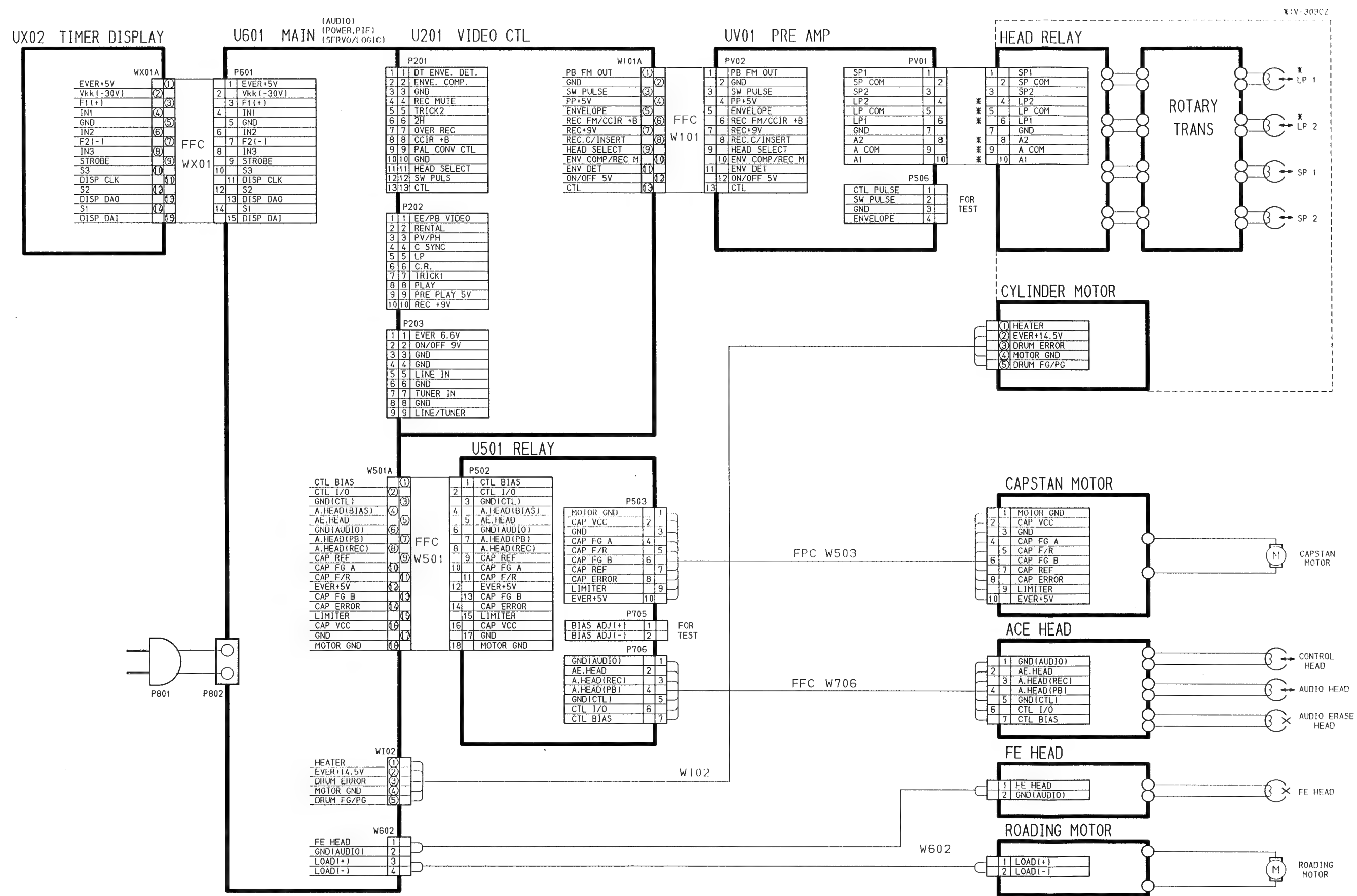
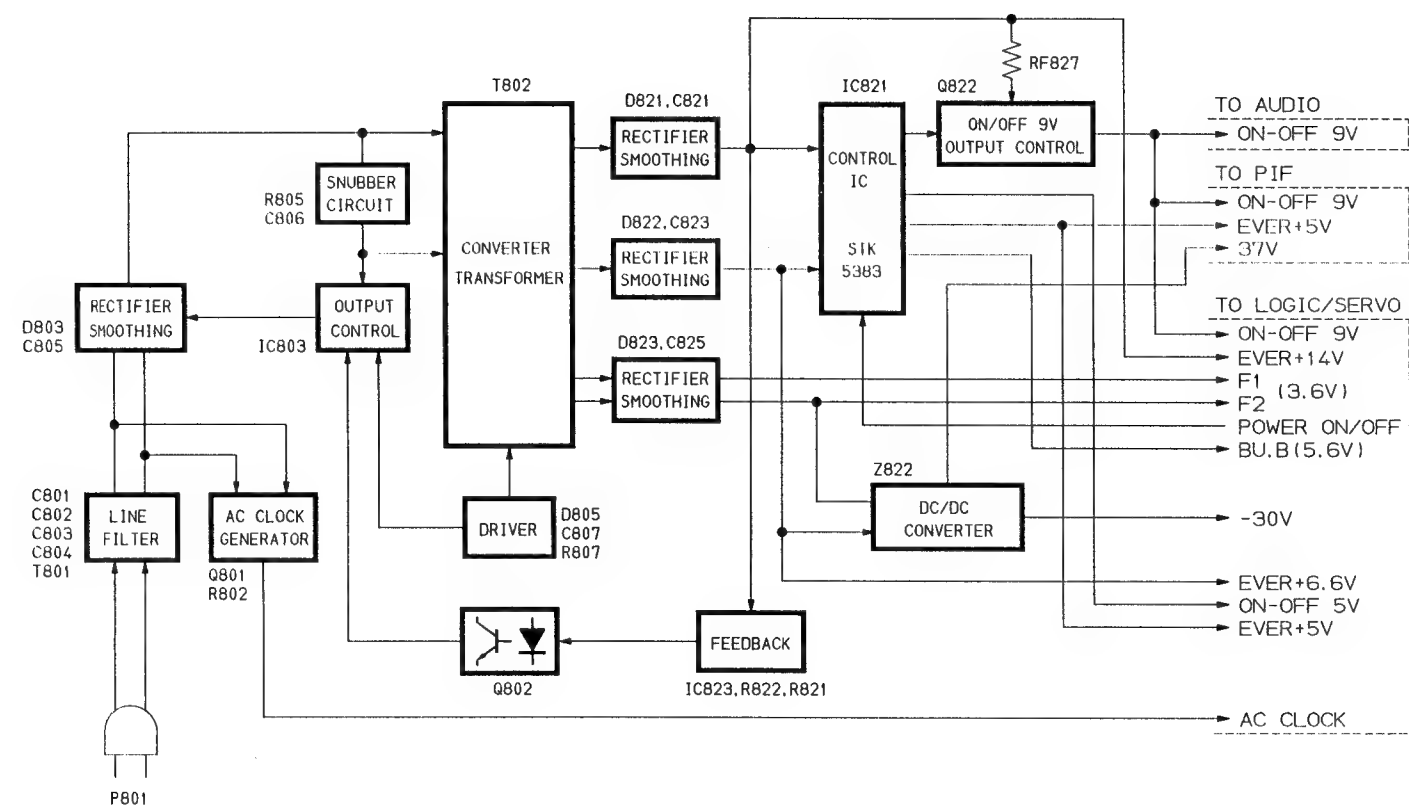


Fig. 8

6. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

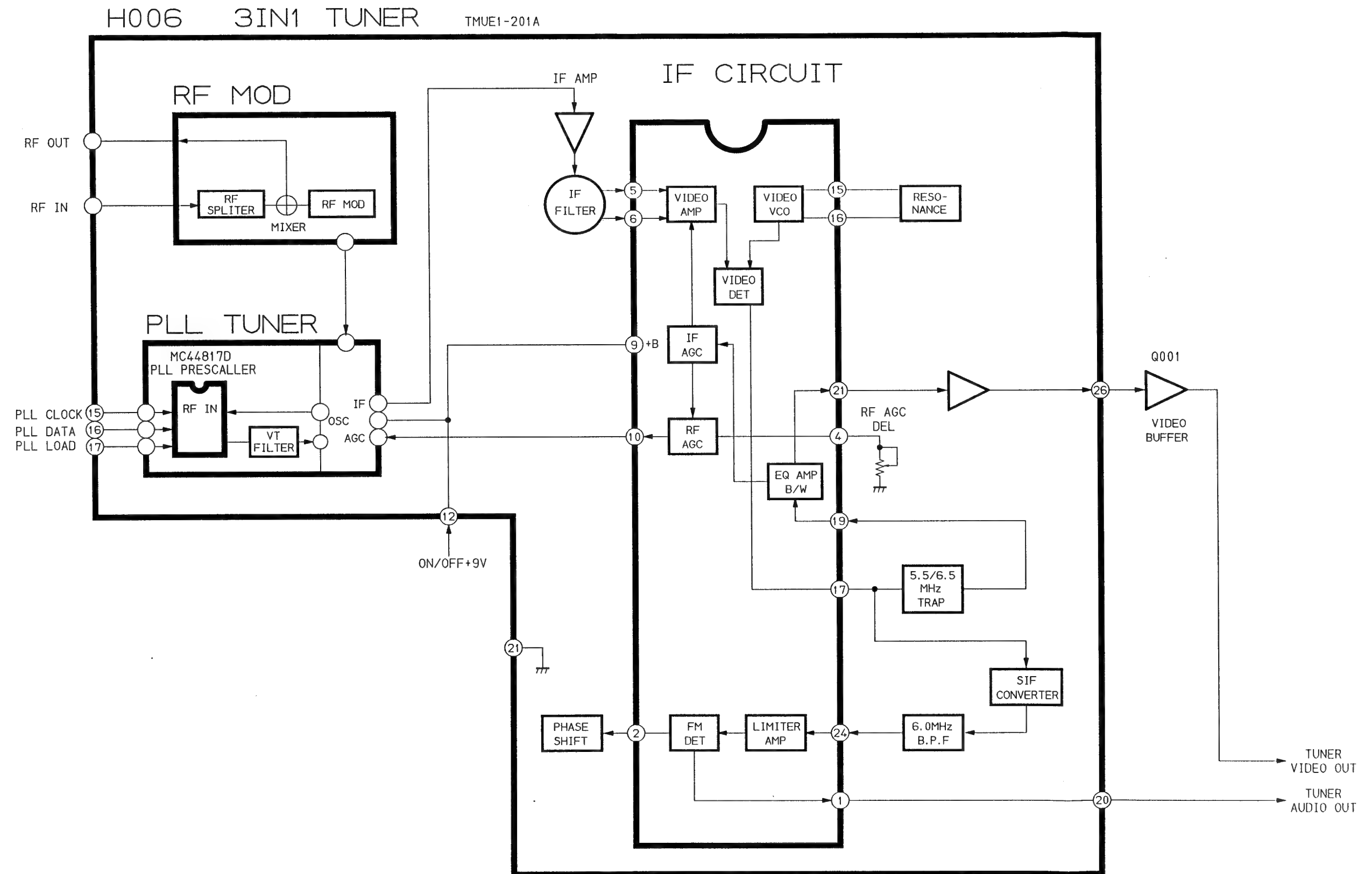


7. BLOCK DIAGRAMS
7-1. POWER BLOCK DIAGRAM



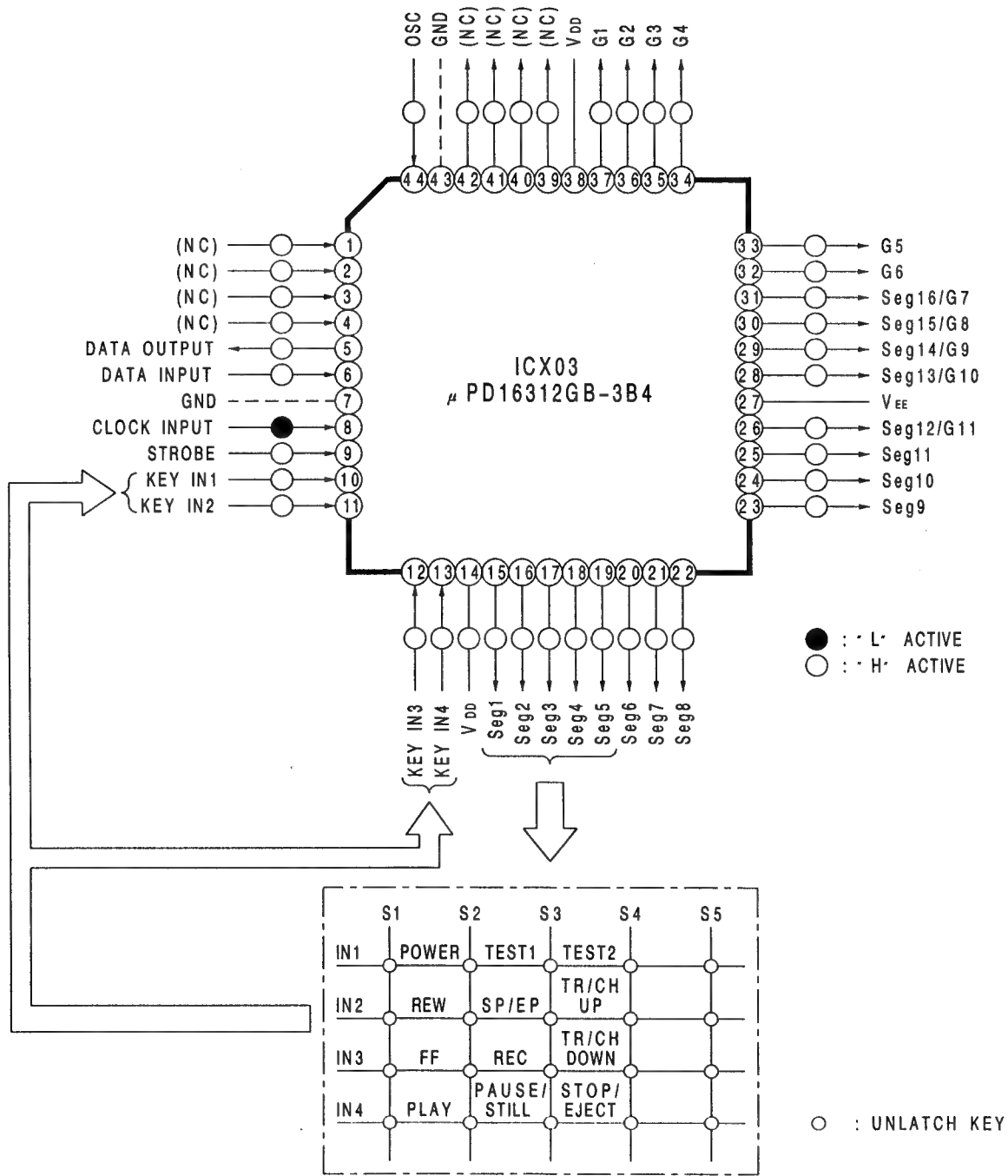
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7-2. PIF BLOCK DIAGRAM

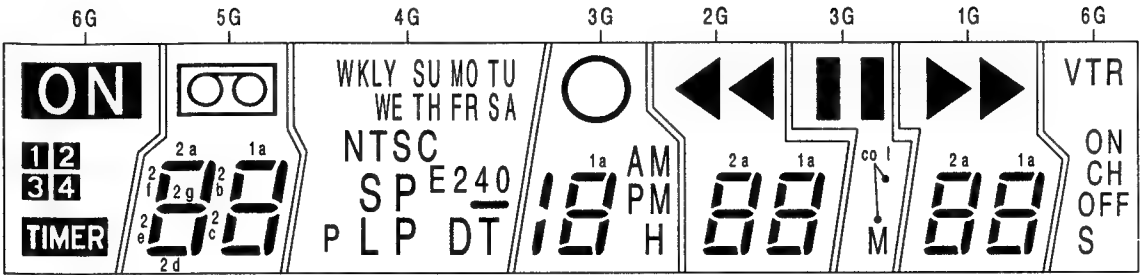


7-3. TIMER DISPLAY BLOCK DIAGRAM

TIMER MICROCOMPUTER
TERMINAL FUNCTION

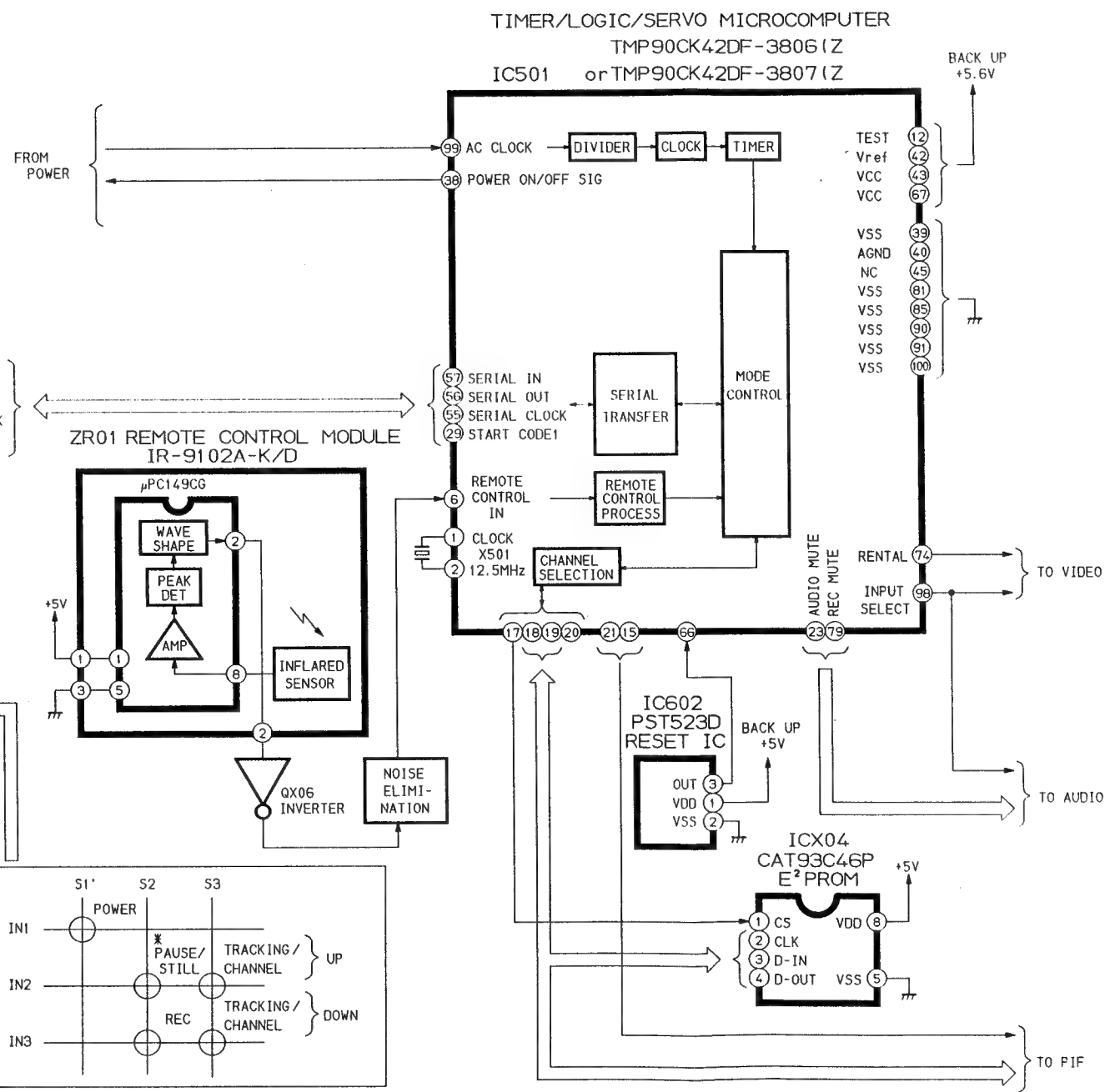
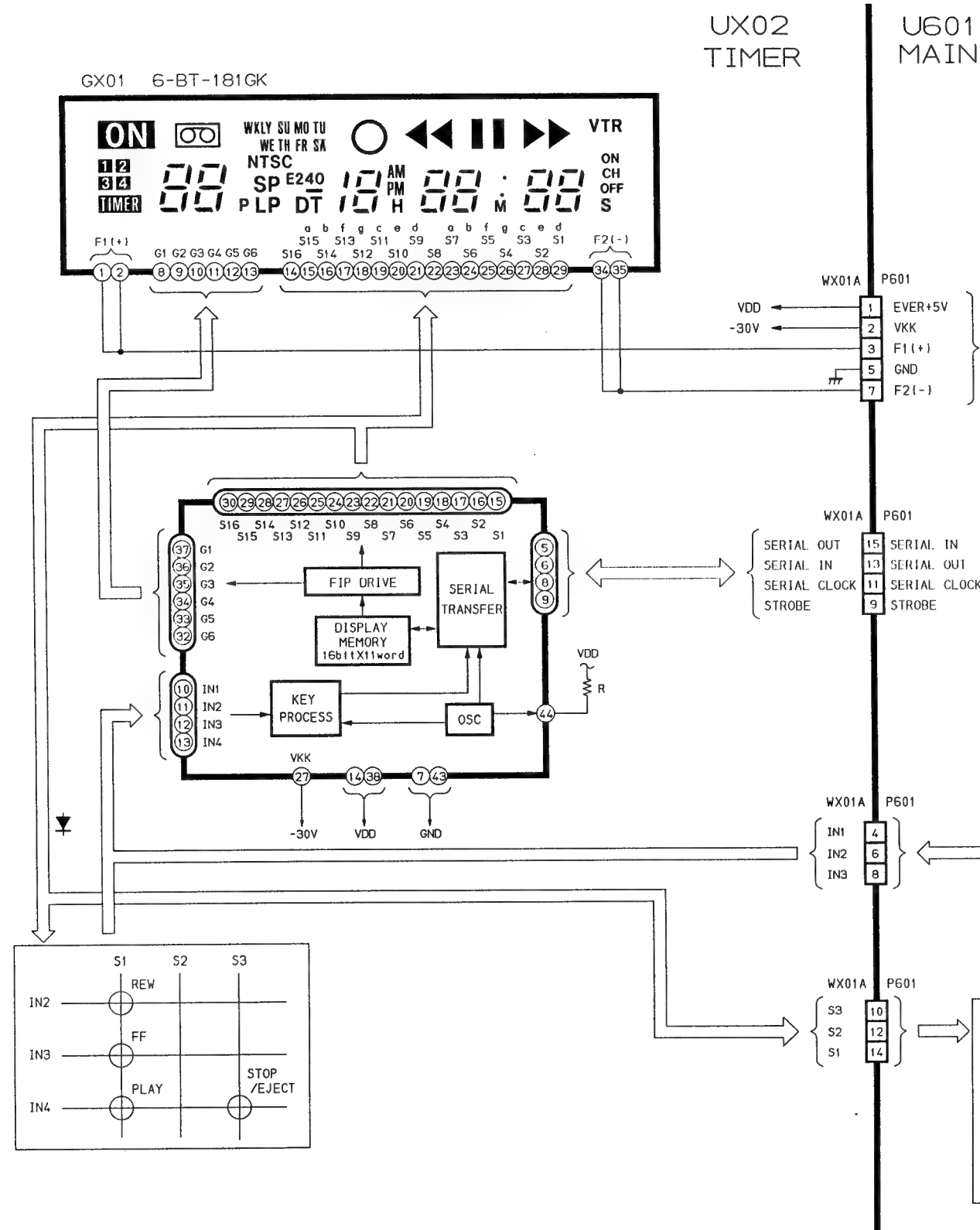


Timer Display 6-BT-181GK

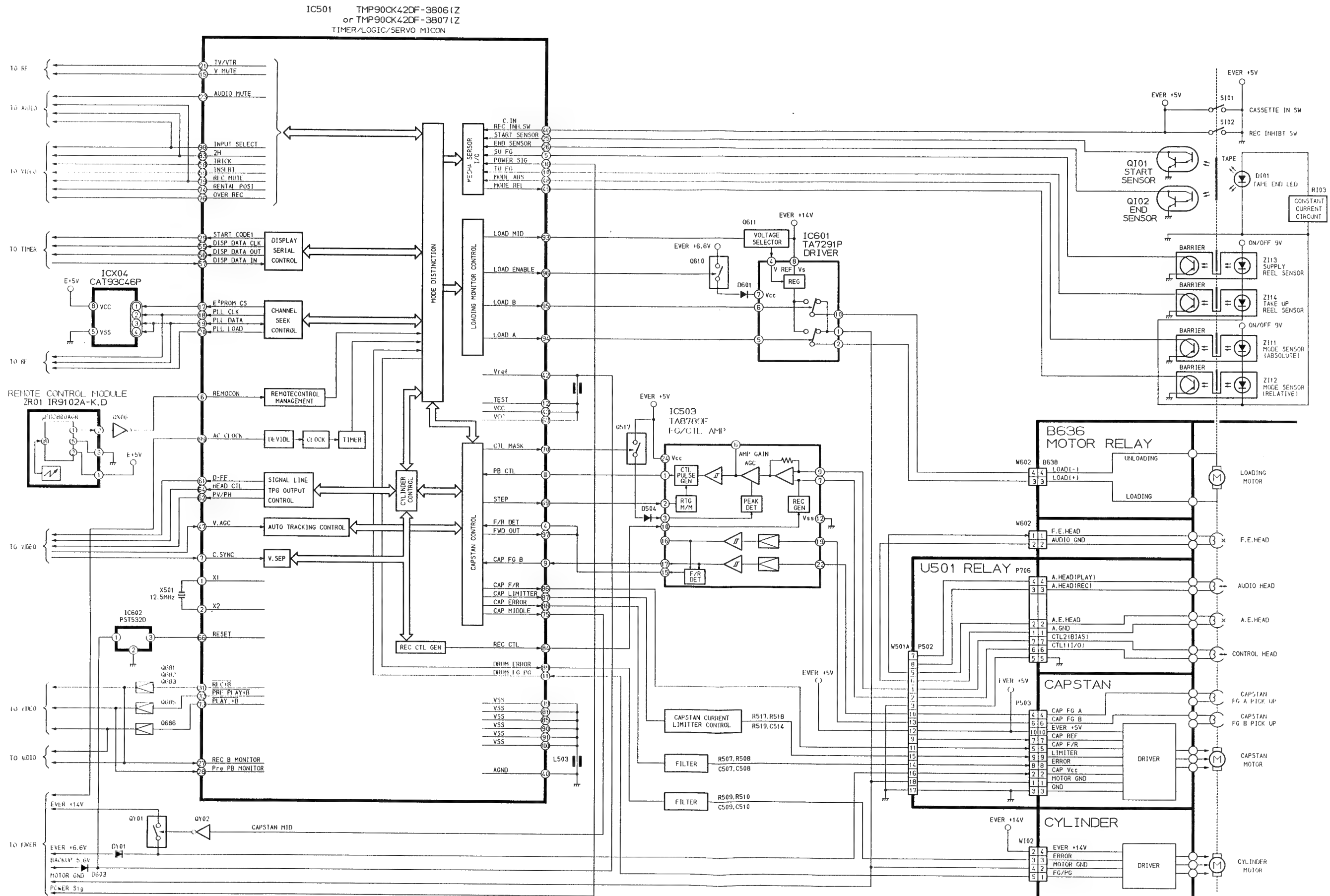


Timer Display Pattern

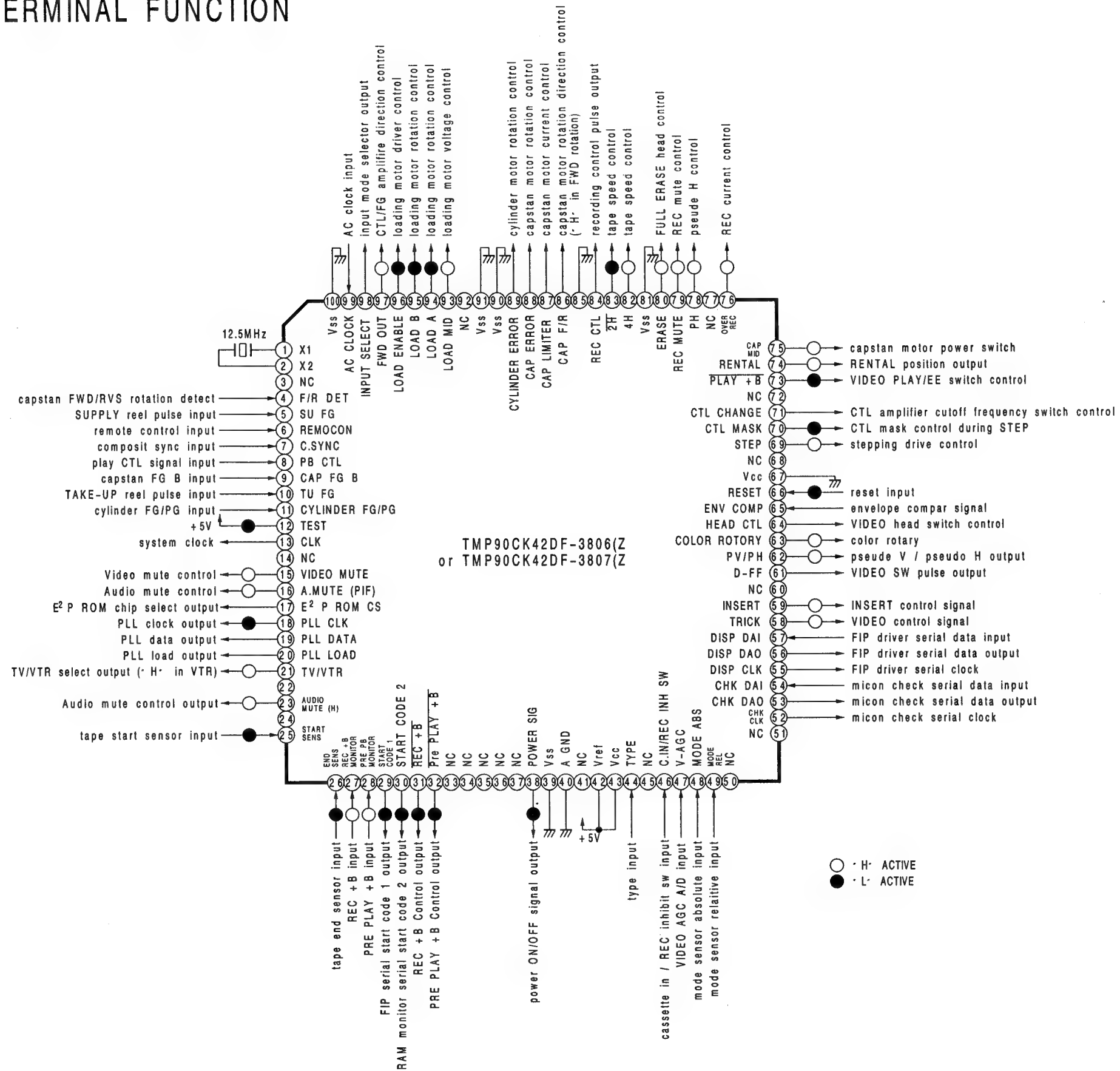
	6G	5G	4G	3G	2G	1G
S1	ON	1d	NTSC	1d	1d	1d
S2	TIMER	1e	E240	1e	1e	1e
S3	OFF	1c	—	1c	1c	1c
S4	CH	1g	DT	1g	1g	1g
S5	S	1f	SP	1f	1f	1f
S6	ON	1b	LP	1b	1b	1b
S7	VTR	1a	P	1a	1a	1a
S8	—	1a	—	1a	1a	1a
S9	—	2d	SA	H	2d	2d
S10	—	2e	FR	PM	2e	2e
S11	—	2c	TH	AM	2c	2c
S12	—	2g	WE	!	2g	2g
S13	4	2f	TU	col	2f	2f
S14	3	2b	MO	M	2b	2b
S15	2	2a	SU	! [L]	2a	2a
S16	1	—	WKLY	○	◀ [R] ▶ [L]	◀ [R] ▶ [L]



7-4. LOGIC/SERVO BLOCK DIAGRAM



SERVO MICROCOMPUTER TERMINAL FUNCTION



SERVO MICROCOMPUTER OUTPUT POLARITY

IC501 TMP90CK42DF-3806(Z or TMP90CK42DF-3807(Z

PIN No.	PORT	MODE PORT NAME	Act.	SLOT IN	SLOT OUT	LOADING	UN-LOADING	STOP	FF	REW	PLAY SP LP	CUE SP LP	REV SP LP	STILL SP LP	SLOW SP LP	REC SP LP	REC PAUSE SP LP	POWER OFF	INITIAL OUT
21	P06	TV/VTR	H	*1	←	←	←	←	←	←	H	H	H	H	H	*1	←	L	L
23	P10	AUDIO MUTE	H	L	L	L	L	L	L	L	L	H	H	H	H	L	L	H	H
31	P80	REC+B	L	H	H	H	H	H	H	H	H	H	H	H	H	L	L	H	H
32	P81	Pre PLAY+B	L	H	H	H	H	H	H	H	L	L	L	L	L	H	H	H	H
33	P82	CCR+B	L	*2	←	←	←	←	←	←	←	←	←	←	←	←	←	←	H
38	P87	POWER SIG	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H
58	P56	TRICK	H	L	L	L	L	L	L	L	L	H	H	L	L	L	L	L	L
59	P57	INSERT	H	L	L	L	L	L	L	L	L	H L	H L	L	L	L	L	L	L
61	DFF	D-FF		L	L		←	L *3		←	←	←	←	←	←	←	←	L	L
62	PV/PH	PV	H	L	L	L	L	L	L	L	L		←	←	←	L	L	L	L
63	CR	COLOR ROTARY	—		←	←	←	←	←	←	←			L H			←	←	L
64	HA	HEAD CTL	—	*4	←	←	←	←	←	←	←					L H	←	←	H
69	P31	STEP	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
70	P32	CTL MASK	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
71	P33	CTL CHANGE	L	H	H	H	H	H	L	L	H	H	H	H	H	H	H	H	H
73	P35	PLAY+B	L	H	H	H	H	H	H	H	L	L	L	L	L	H	H	H	H
75	P37	CAP MID	H	H	H	H	H	H	H	H	L	H	H	H	H	L	H	H	H
76	P20	OVER REC	H	L	L	L	L	L	L	L	L	L	L	L	L		L	L	L
78	P22	PH	H	L	L	L	L	L	L	L	L		←	←	←	L	L	L	L
79	P23	REC MUTE	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H
80	P24	ERASE	H	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L
82	P25	4H	H	*5	←	←	←	←	←	←	L H	L H	L H	L H	L H	*5	←	←	L
83	P26	2H	L	*5	←	←	←	←	←	←	L H	L H	L H	L H	L H	*5	←	←	L
84	P27	REC CTL		OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN		OPEN	OPEN	OPEN
86	P66	CAP F/R	—	L	H	L	L	H	L	H	H	H	L	H		H	H	H	H
87	PWM8	CAP LIMITTER	—	PWM	PWM	PWM	PWM	PWM	H	H	H	H	H	L	PWM	H	PWM	PWM	L
88	PWM1	CAP ERROR	PWM	L	L	L	PWM	L	PWM	PWM	PWM	PWM	PWM	L		PWM	L	L	L
89	PWM0	CYLINDER ERROR	PWM	L	L	PWM	PWM	PWM→L	PWM	PWM	PWM	PWM	PWM	PWM	PWM	PWM	PWM	L	L
93	P71	LOAD MID	H	L	L		L	L	L	L	L	L	L	L	L	L	L	L	L
94	P72	LOAD A	L	H			L	H	H	H	H	H	H	H	H	H	H	H	H
95	P73	LOAD B	L	L			H	H	H	H	H	H	H	H	H	H	H	H	H
96	P74	LOAD ENABLE	L	L	L→H	L	L	H	H	H	H	H	H	H	H	H	H	H	H
97	P75	FWD OUT	—	H	L	H	H	L	H	L	L	L	H	L		L	L	L	L
98	P76	INPUT SELECT	—	*6	←	←	←	←	←	←	←	←	←	←	←	←	←	←	L

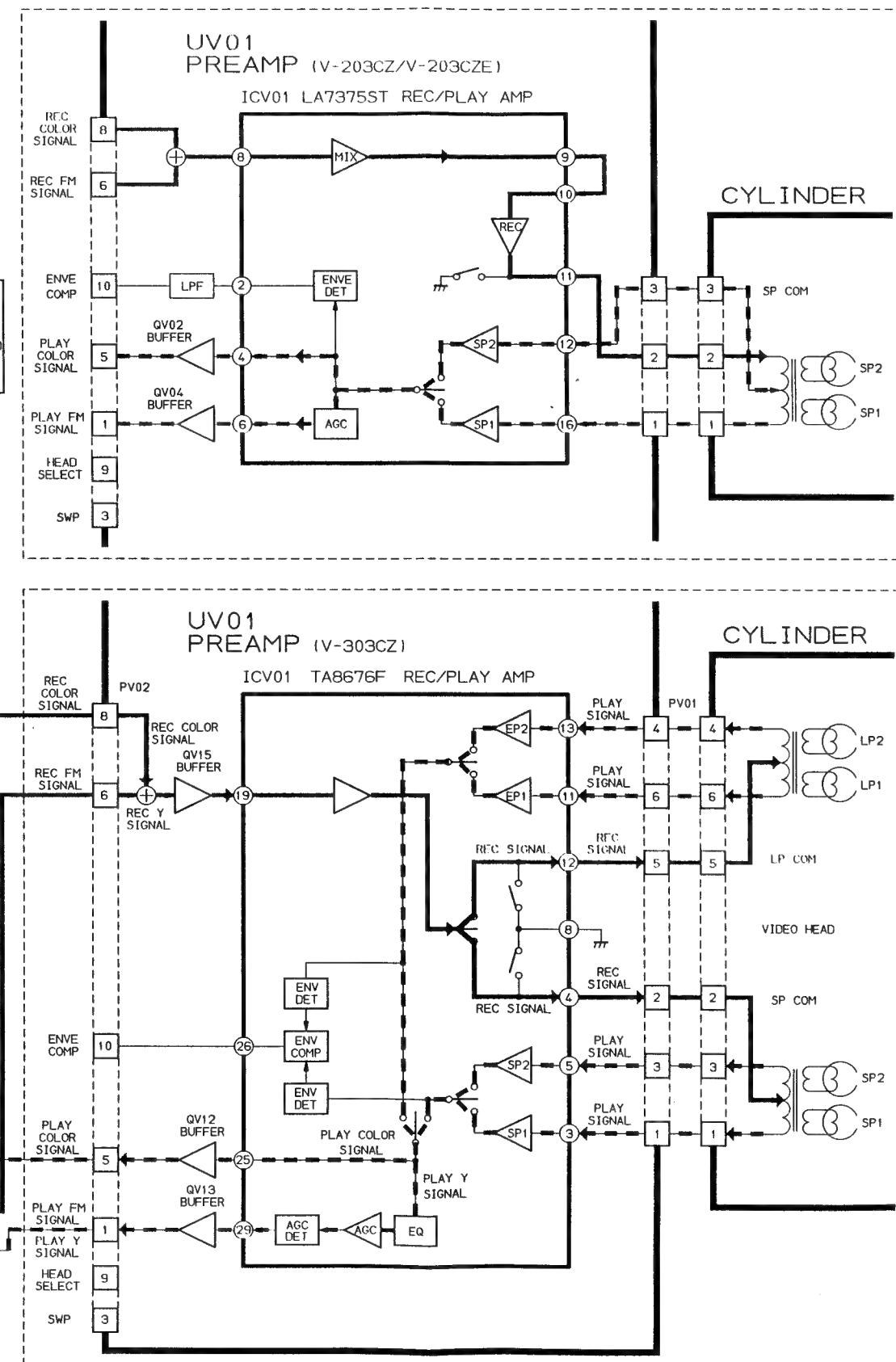
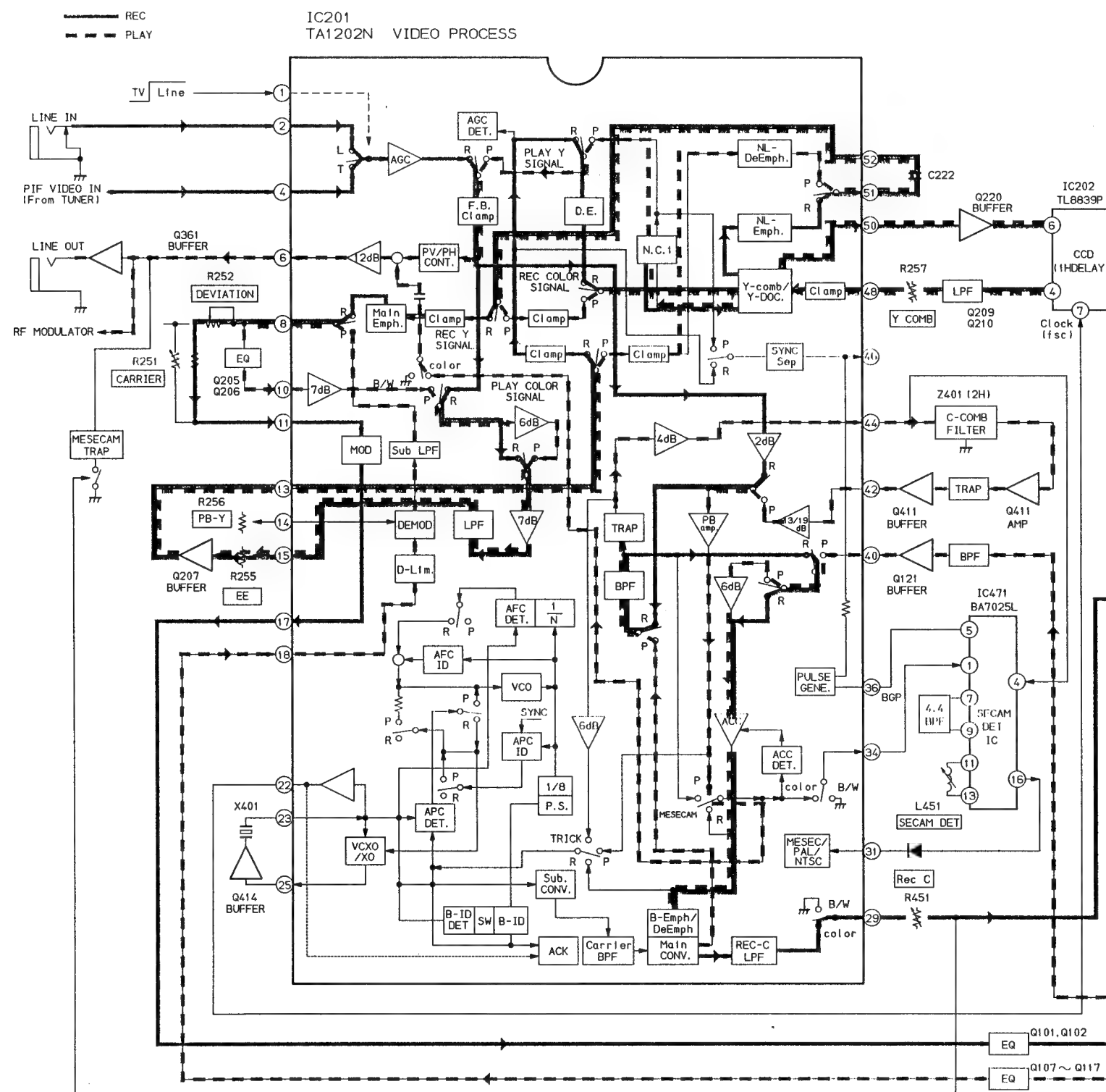
- *1 : Maintains the output of previous mode.
 *2 : When the input signal or play signal is PAL. : - L-
 *3 : For 5 minutes after transferring to STOP mode : , afterward : - L-
 *4 : When SP : - L-, when LP : - H-
 *5 : Depends on SP/LP switch state. When SP : - L-, when LP : - H-
 *6 : Depends on input switch state. When line input : - H-, when RF input : - L-

LOGIC MODE SHIFT TABLE

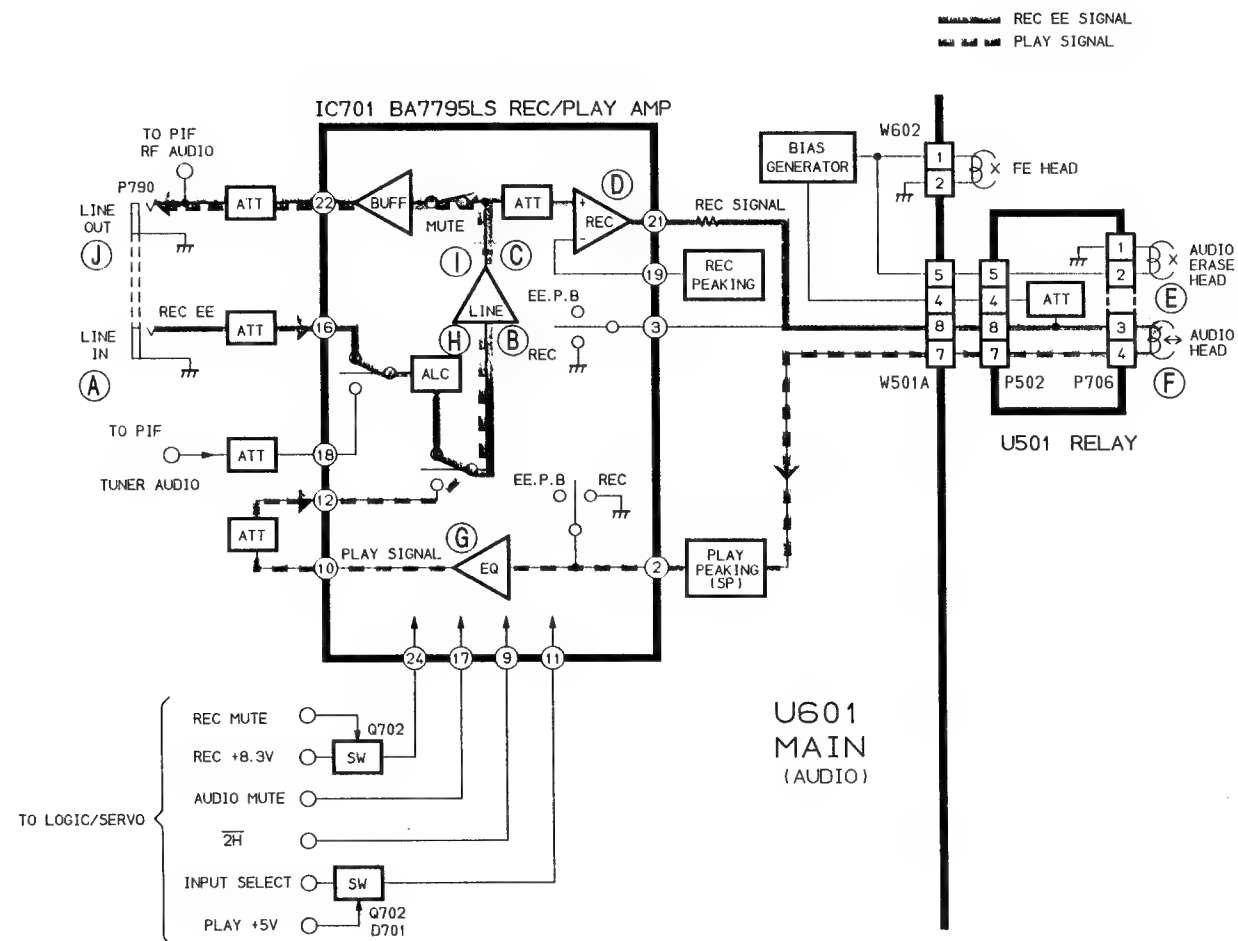
INPUT CURRENT MODE	STOP	PLAY	FF	REW	SLOW	POUSE	REC	REMAIN /CLOCK	POWER	COUNTER RESET	T.START	T.END
STOP	EJECT	○	○	○	×	×	○	REMAIN	OFF	RESET	*	*
FF	○	○	CUE	○	×	×	×	○	OFF	RESET	—	STOP
REW	○	○	○	REVIEW	×	×	×	○	OFF	RESET	*	—
PLAY	○	—	CUE	REVIEW	○	STILL	×	○	OFF	RESET	—	REWIND
SLOW	○	○	CUE	REVIEW	○	STILL	×	○	OFF	RESET	—	REWIND
STILL	○	○	CUE	REVIEW	○	PLAY	REC PAUSE	○	OFF	RESET	—	REWIND
CUE	○	○	FF	REVIEW	×	×	×	○	OFF	RESET	—	REWIND
REVIEW	○	○	CUE	REW	×	×	×	○	OFF	RESET	*	—
REC	○	×	×	×	×	REC PAUSE	—	○	OFF	RESET	—	REWIND
REC. PAUSE	○	×	×	×	×	REC	—	○	OFF	RESET	—	—
POWER OFF	EJECT	×	×	×	×	×	×	×	ON	×	—	—
TIMER WAITE	×	×	×	×	×	×	×	×	ON	×	—	—
TIMER REC	×	×	×	×	×	×	×	○	ON	RESET	—	TIMER WAITE

*The mode shifts to STOP mode after S.FF/S.REW mode.

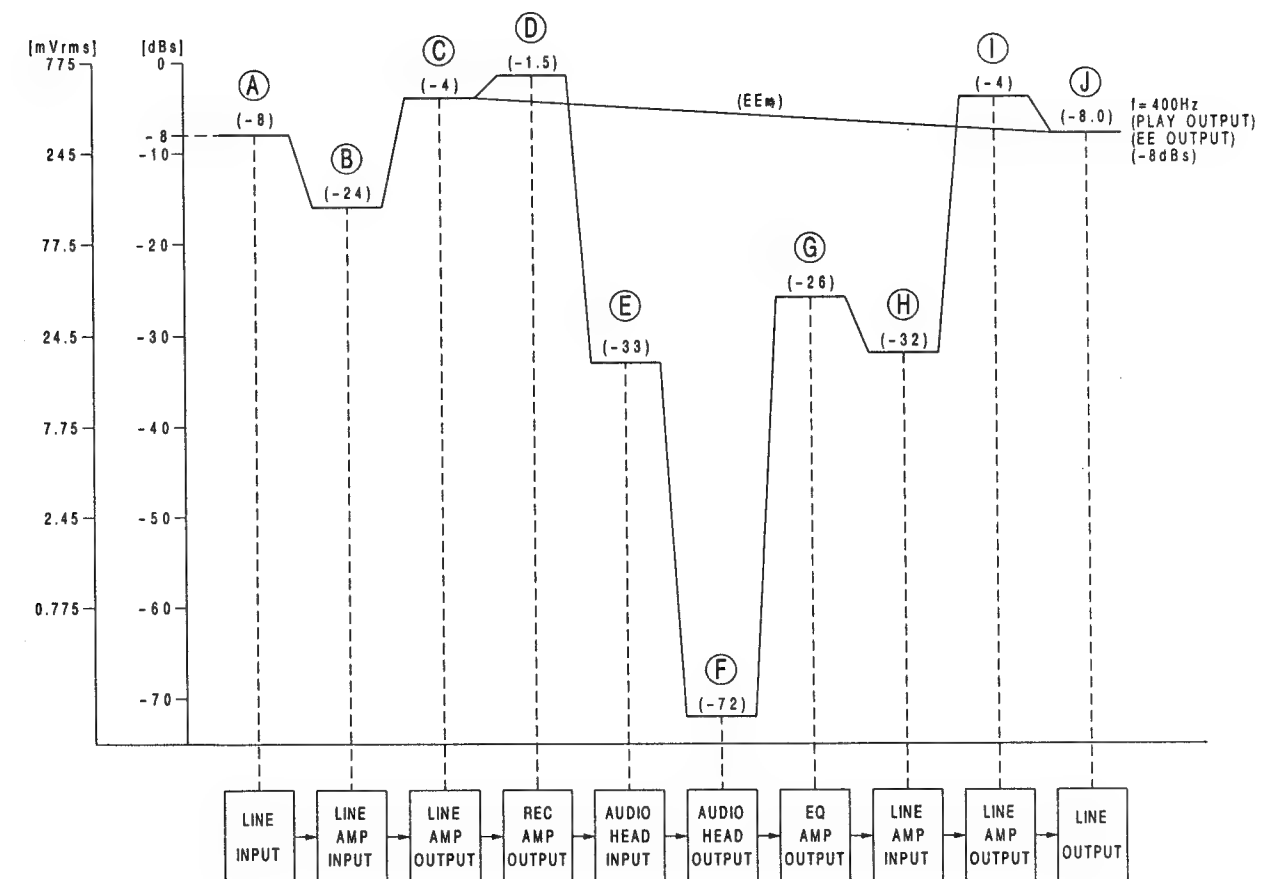
7-5. VIDEO BLOCK DIAGRAM



7-6. AUDIO BLOCK DIAGRAM



AUDIO LEVEL CHART

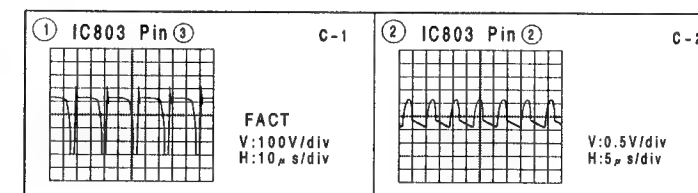
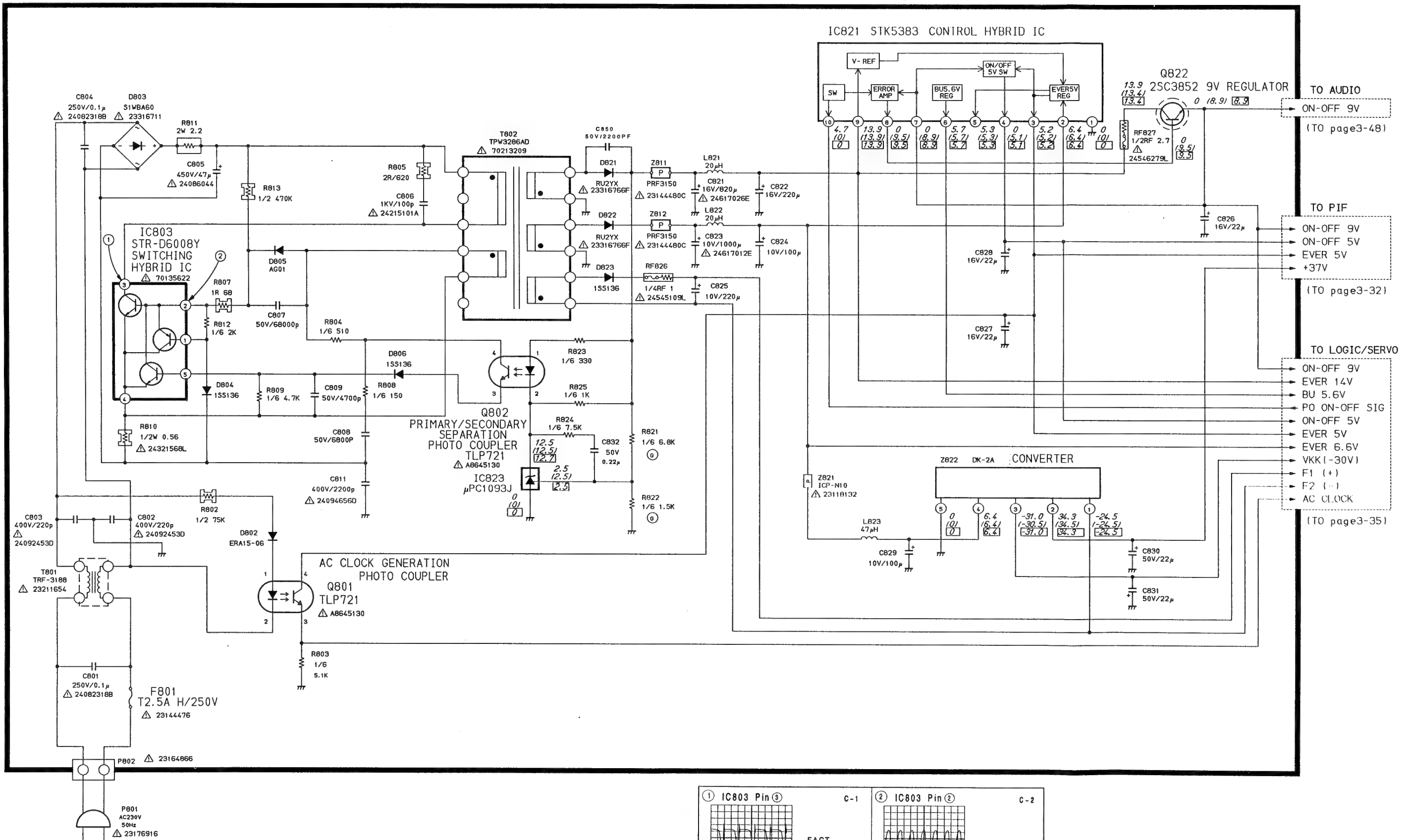


8. CIRCUIT DIAGRAMS

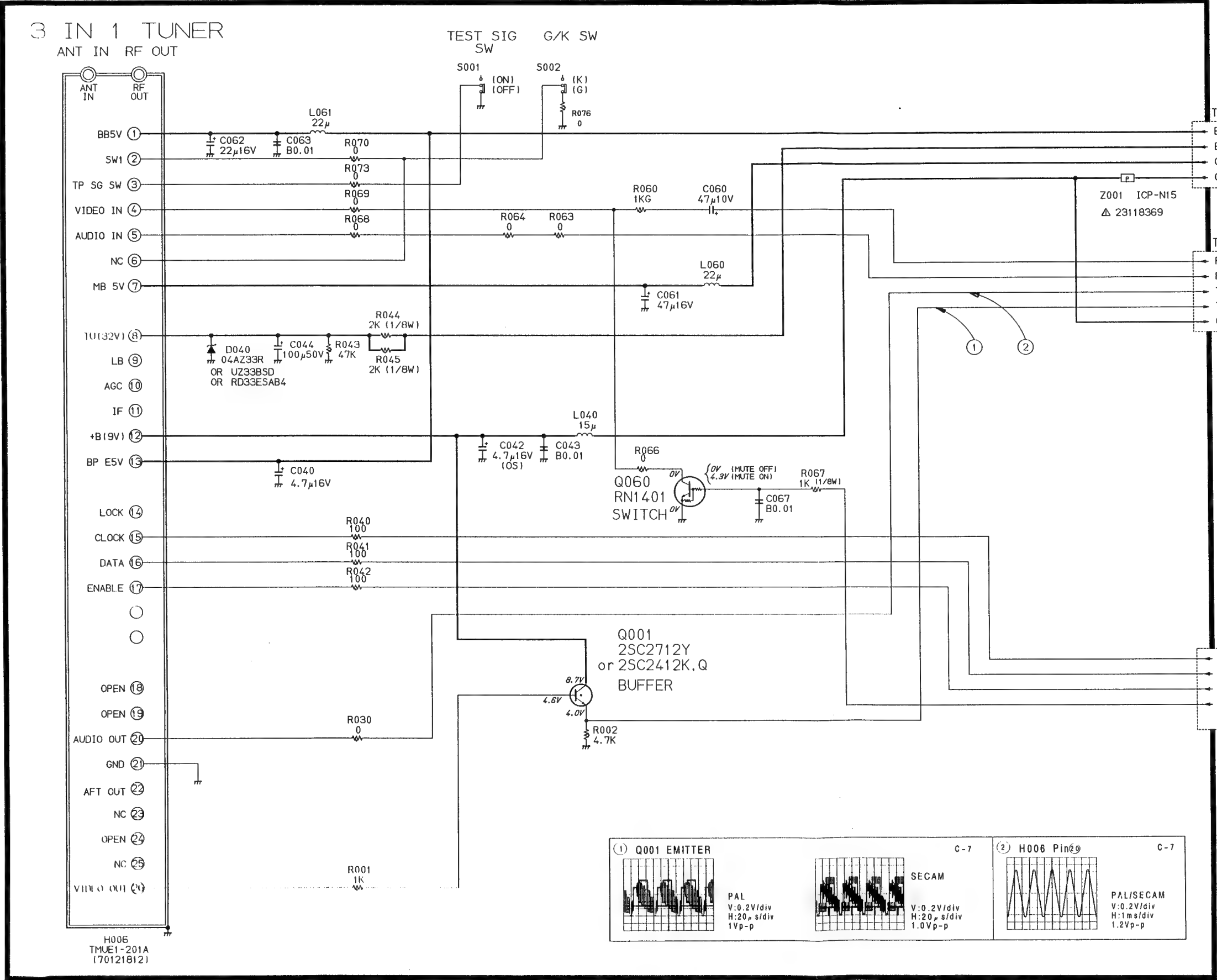
8-1. POWER SUPPLY CIRCUIT DIAGRAM

U601 POWER

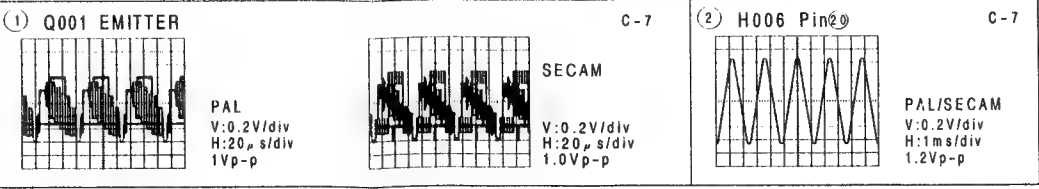
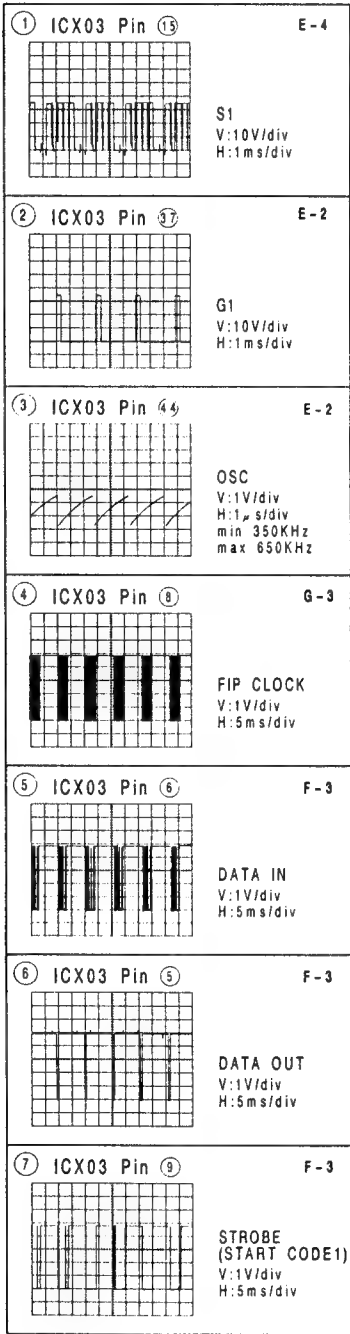
V:OFF, () V:EE, □ V:REC



8-2. PIF CIRCUIT DIAGRAM
U601 MAIN(PIF)

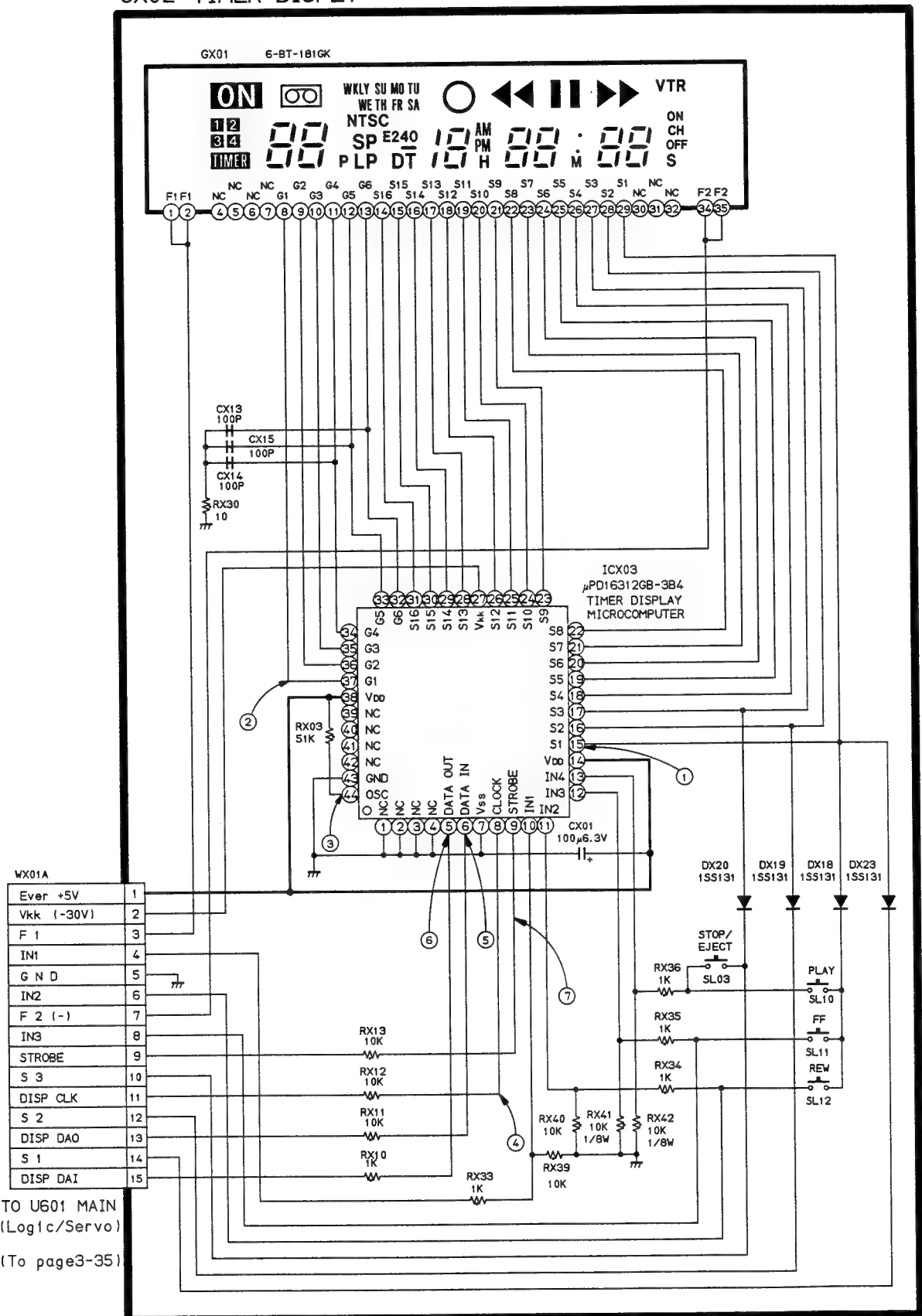


TIMER DISPLAY WAVEFORM

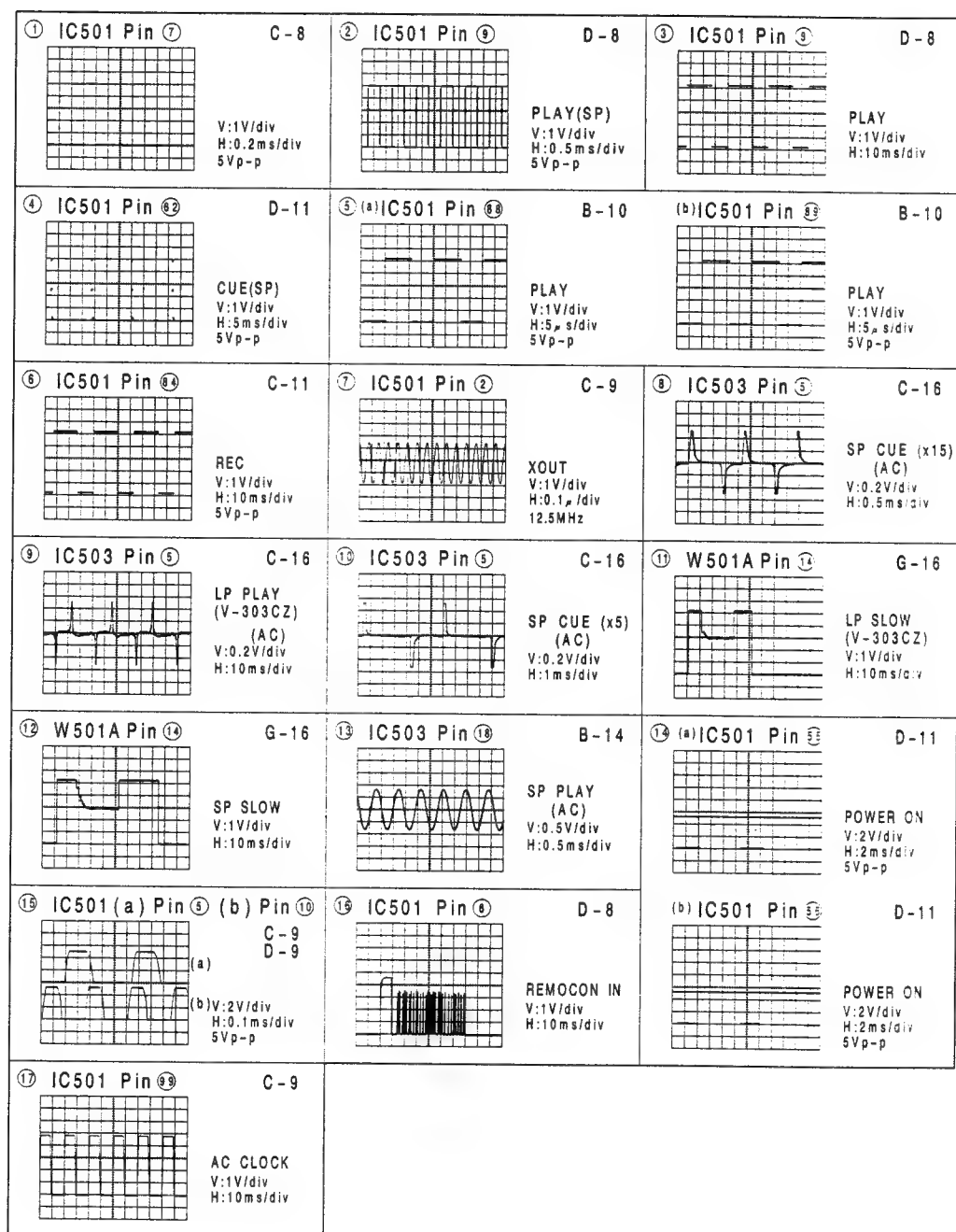


8-3. TIMER DISPLAY CIRCUIT DIAGRAM

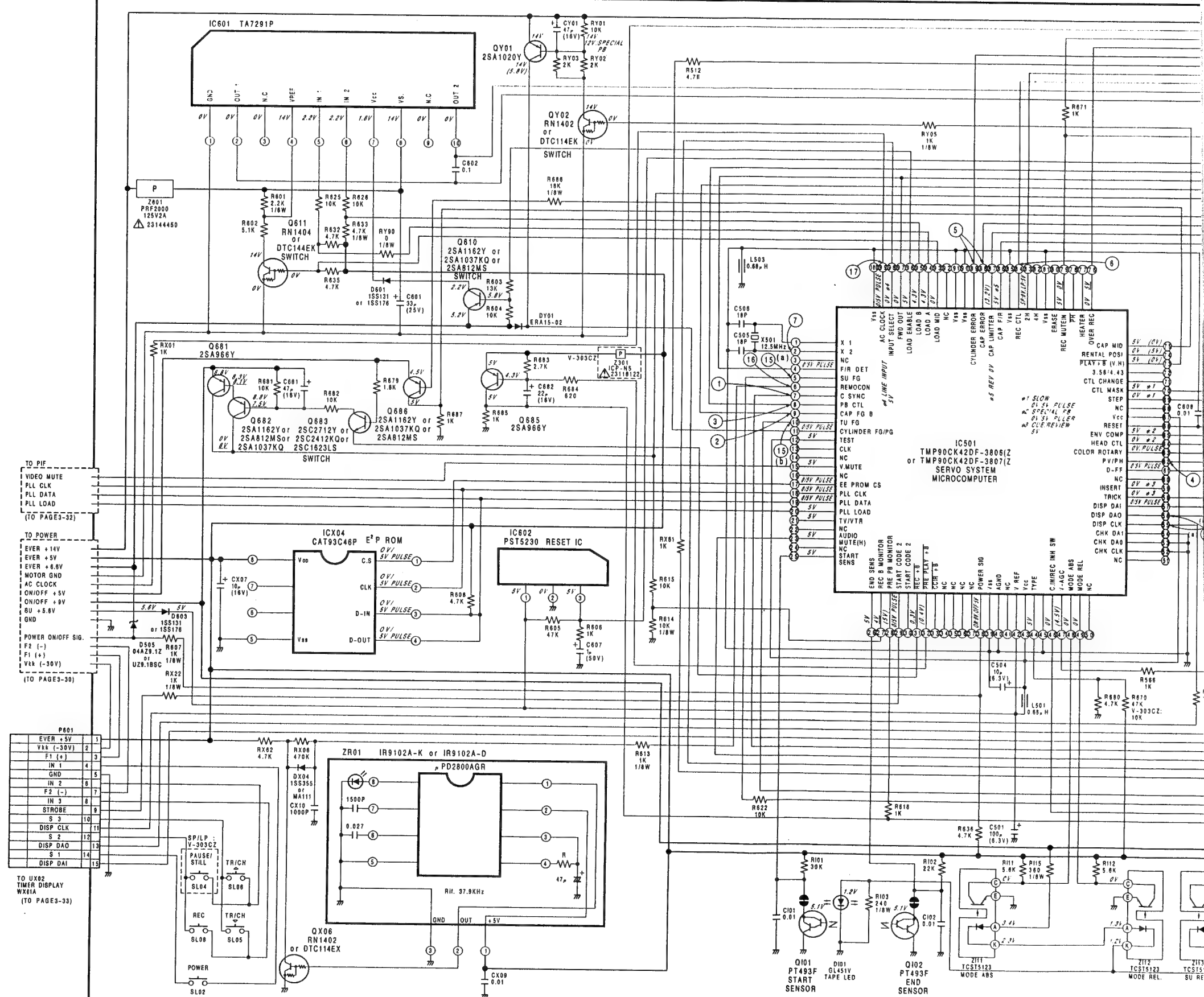
UX02 TIMER DISPLY

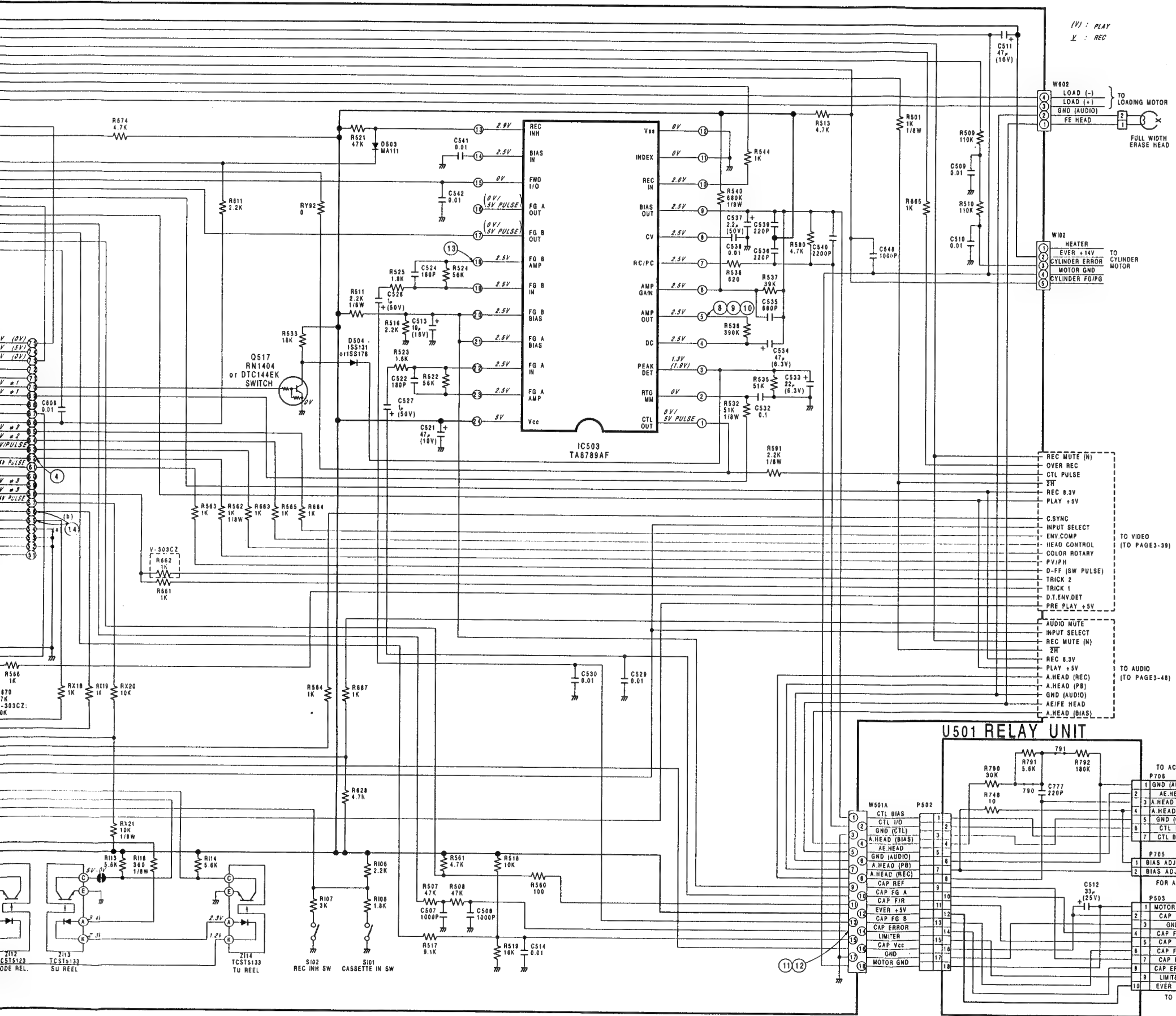


8-4. LOGIC/SERVO CIRCUIT DIAGRAM

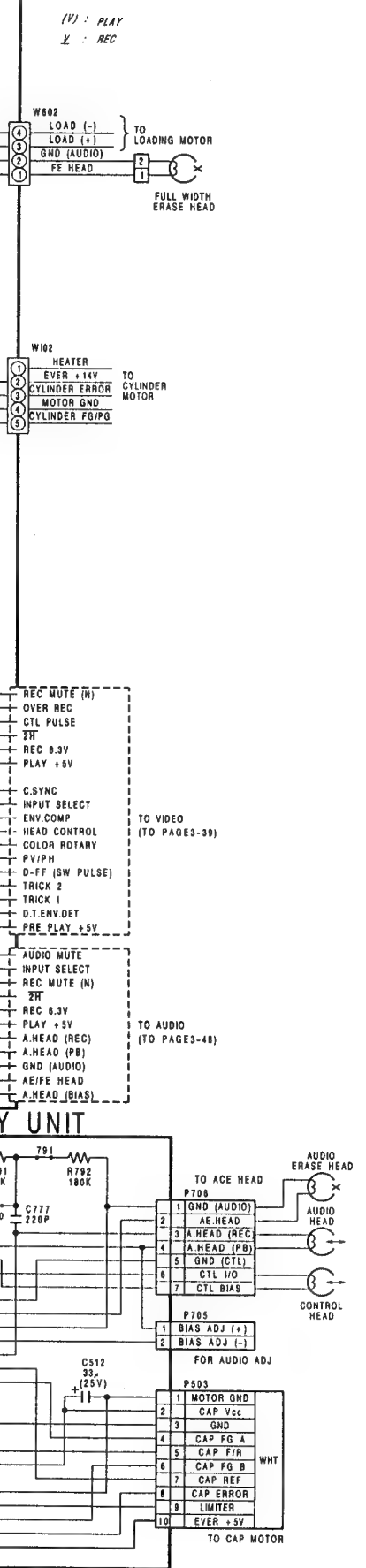


U601 MAIN (LOGIC/SERVO)



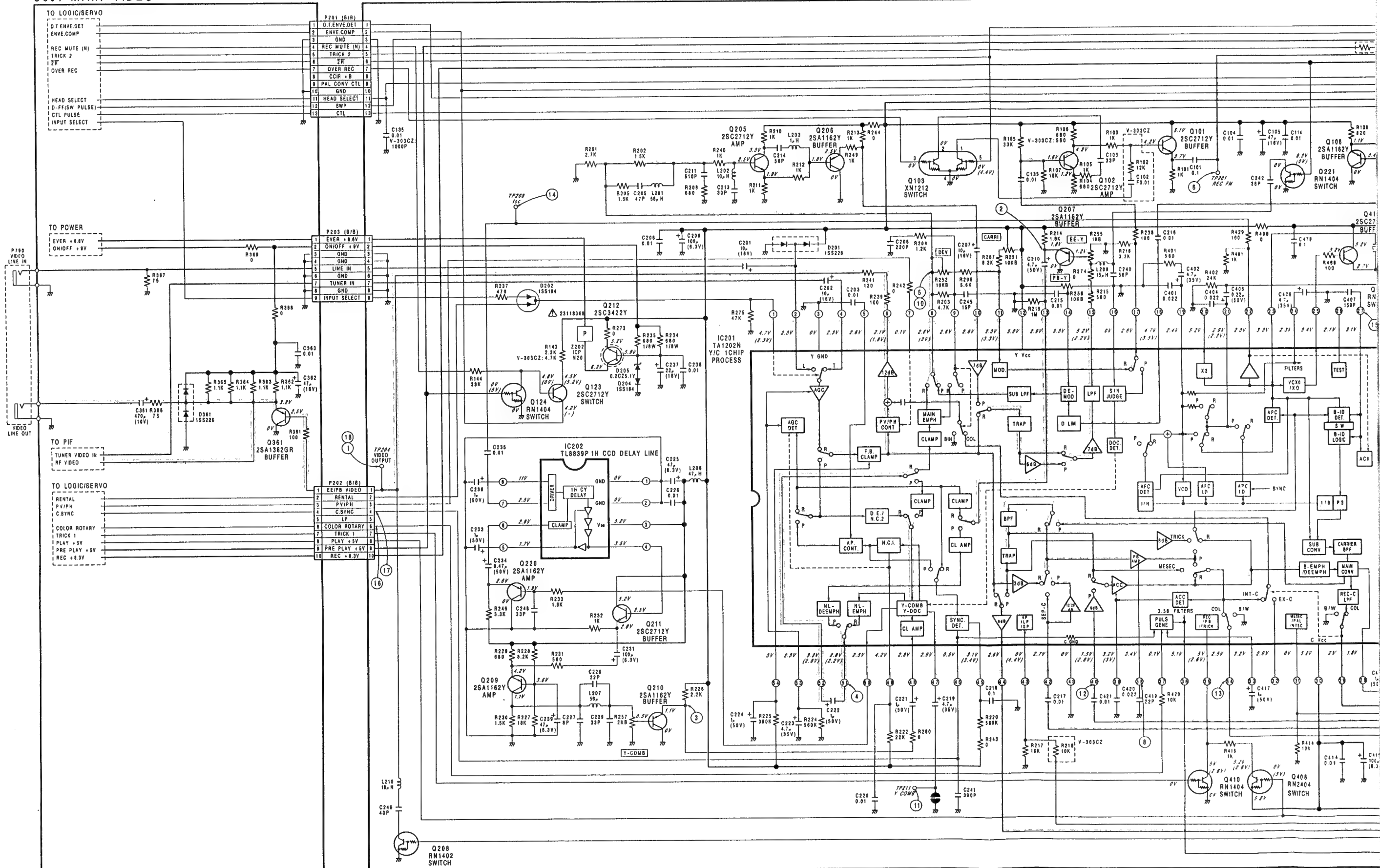


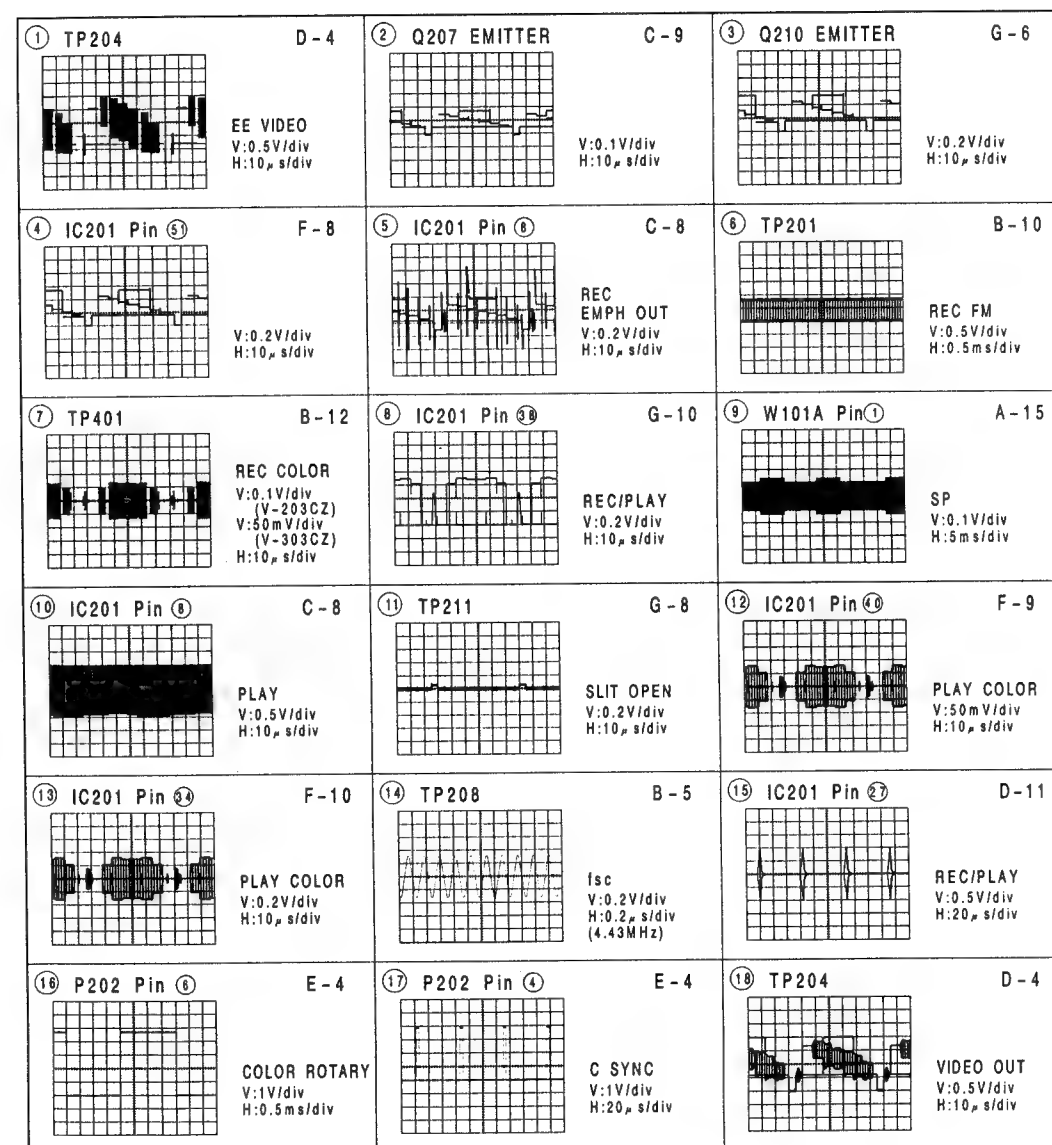
LOGIC/SERVO VIDEO LOGIC/SERVO VIDEO



8-5. VIDEO CIRCUIT DIAGRAM U601 MAIN VIDEO

U201 VIDEO CONTROL

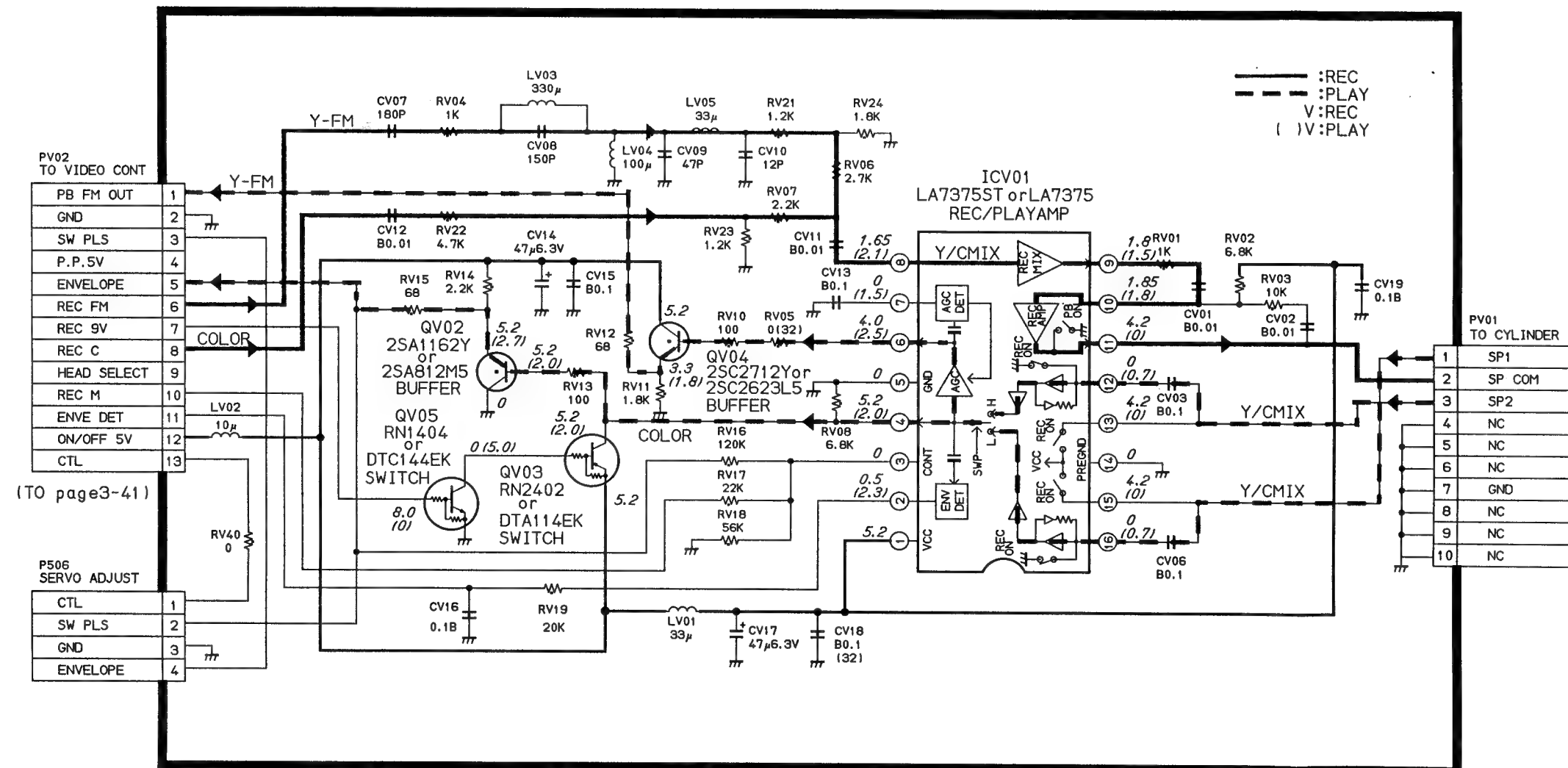




8-6. PRE AMP CIRCUIT DIAGRAM

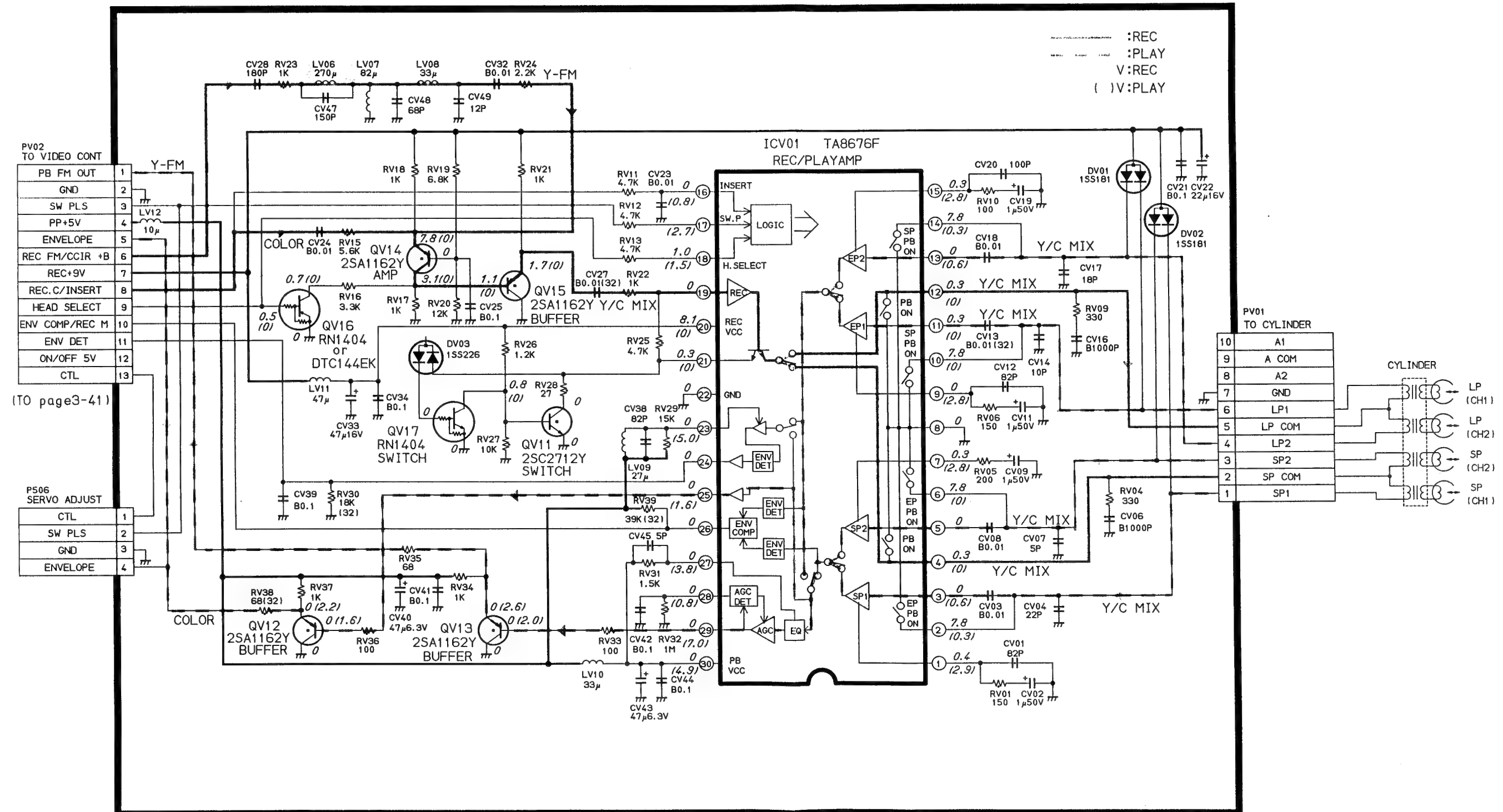
<V-203CZ/203CZE>

UV01 PREAMP



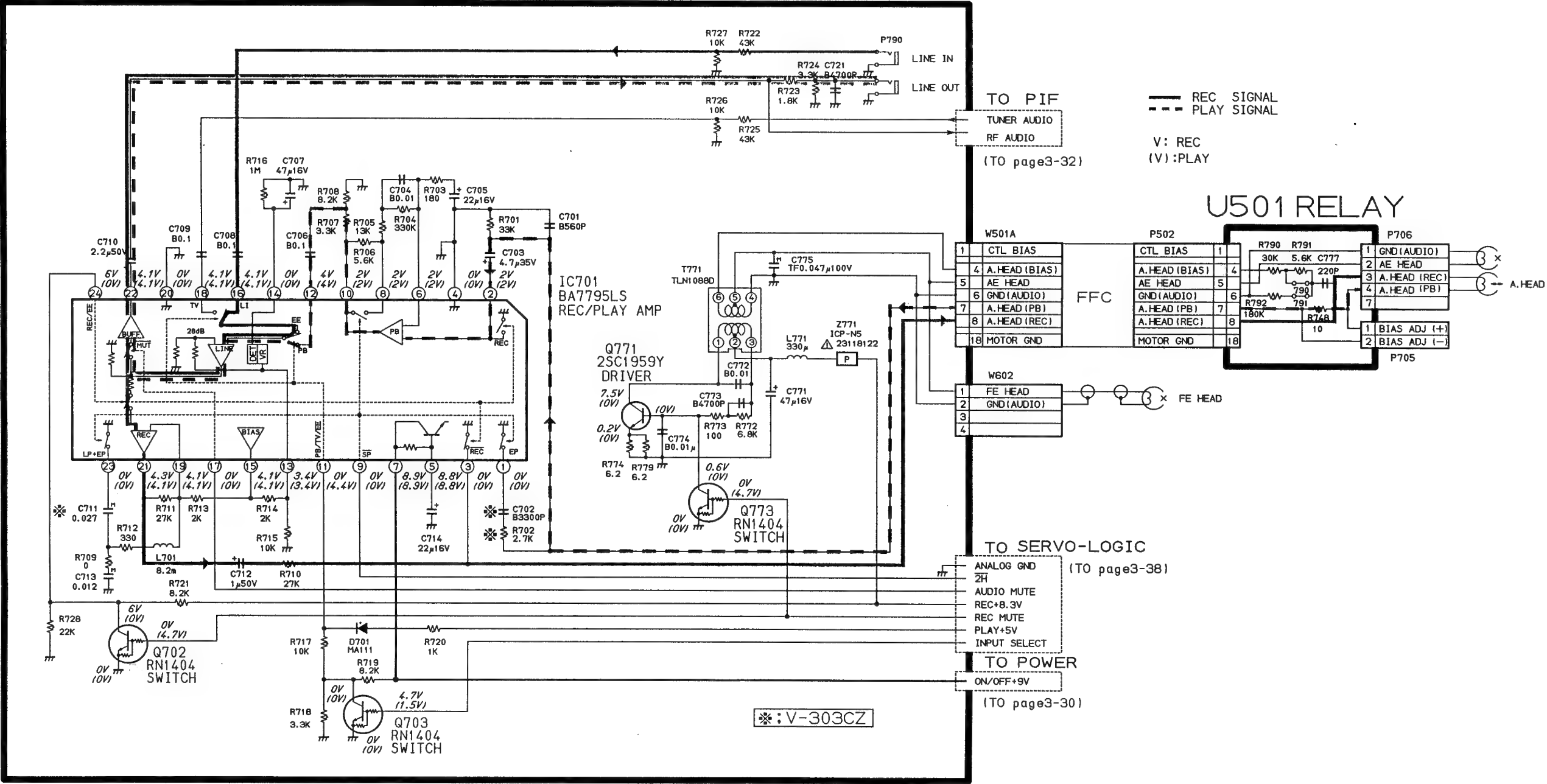
<V-303CZ>

UV01 PREAMP



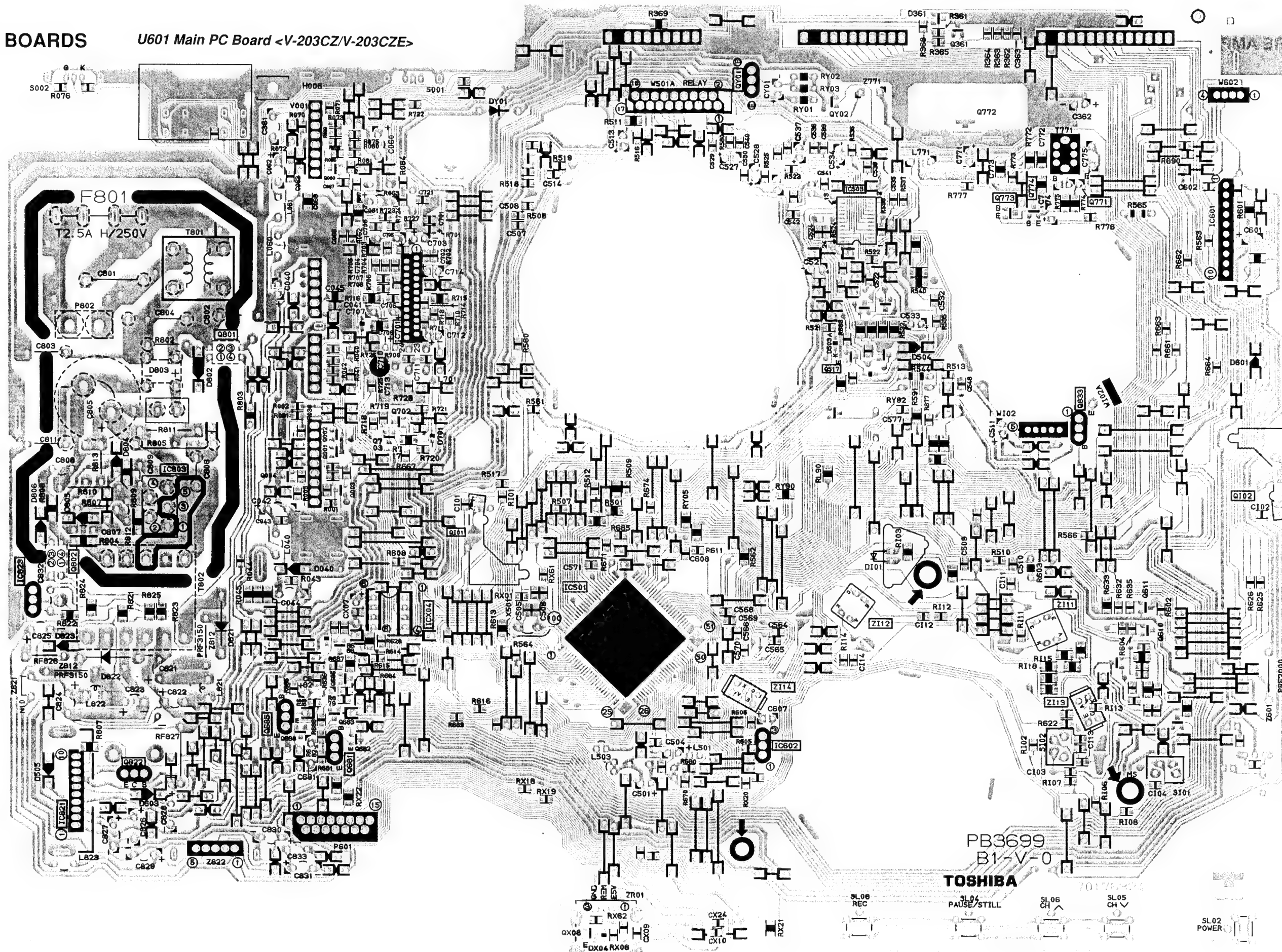
8-7. AUDIO CIRCUIT DIAGRAM

U601 AUDIO



9. PC BOARDS

U601 Main PC Board <V-203CZ/V-203CZE>



SECTION 4 PARTS LIST

SAFETY PRECAUTION

The parts identified by \triangle mark are critical for safety. Replace only with part number specified.
The mounting position of replacement is to be identical with originals. The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.
Parts marked # are of chip type and mounted on original PC boards.
However, when they are placed for servicing works, use discrete parts listed on the parts list.

ABBREVIATIONS

1. Integrated circuit (IC)
2. Capacitor (Cap)

Unit	Ex.
F farad	
MF microfarad ($\mu F = 10^{-6}F$)	10MF = 10 μF
PF picofarad ($pF = 10^{-12}F = 10^{-12}F$)	10PF = 10pF

- Capacitance tolerance (for nominal capacitance higher than 10pF)

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20	± 30

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	+100 0	+30 -10	+50 -10	+75 -10	+20 -10	+100 -10	+40 -20	+150 -10	+80 -20

Ex. 10MF J = 10 $\mu F \pm 5\%$

- Capacitance tolerance (for nominal capacitance lower than 10pF)

Symbol	B	C	D	F	G
Tolerance pF	± 0.1	± 0.25	± 0.5	± 1	± 2

Ex. 10PF G = 10pF $\pm 2pF$

3. Resistor (Res)

Unit	Ex.
No Mark Ω	10 10 Ω
K k Ω	10K 10k Ω
M M Ω	10M 10M Ω
W Watt	1W 1 Watt

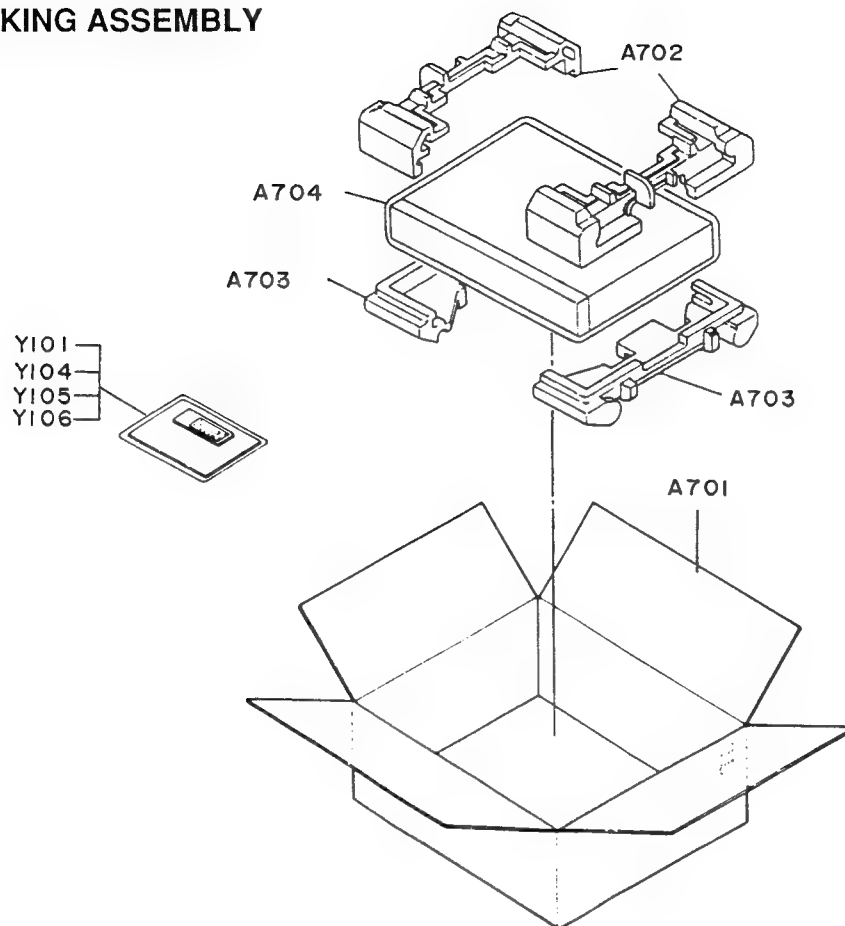
- Resistance tolerance

Symbol	B	C	D	F	G	J	K	M
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20

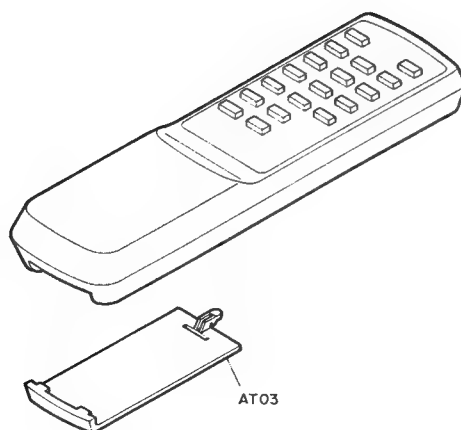
Ex. 470J = 470 $\Omega \pm 5\%$

1. EXPLODED VIEWS

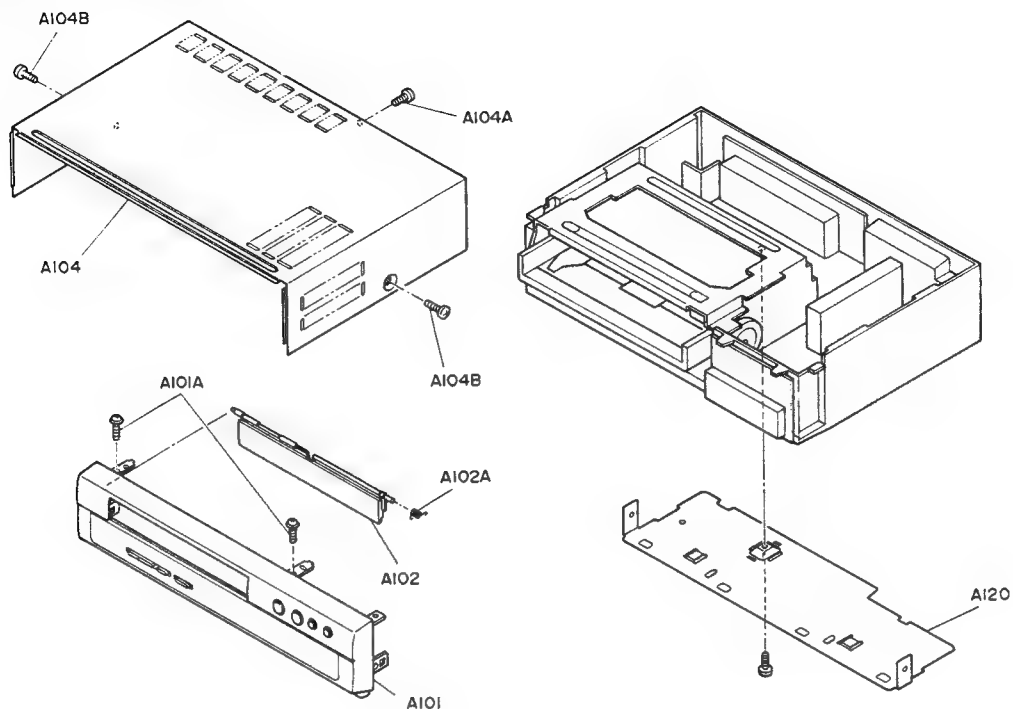
1-1. PACKING ASSEMBLY



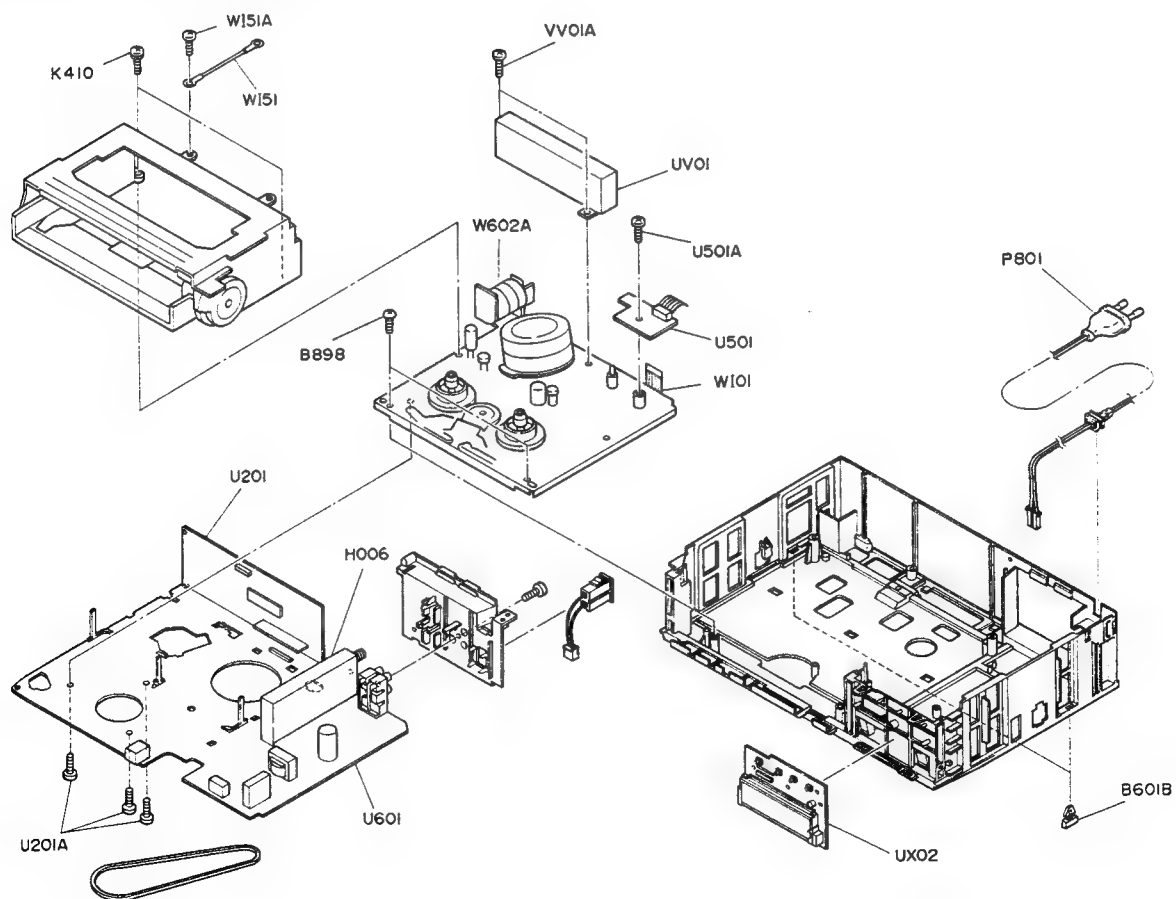
1-2. REMOTE CONTROL UNIT



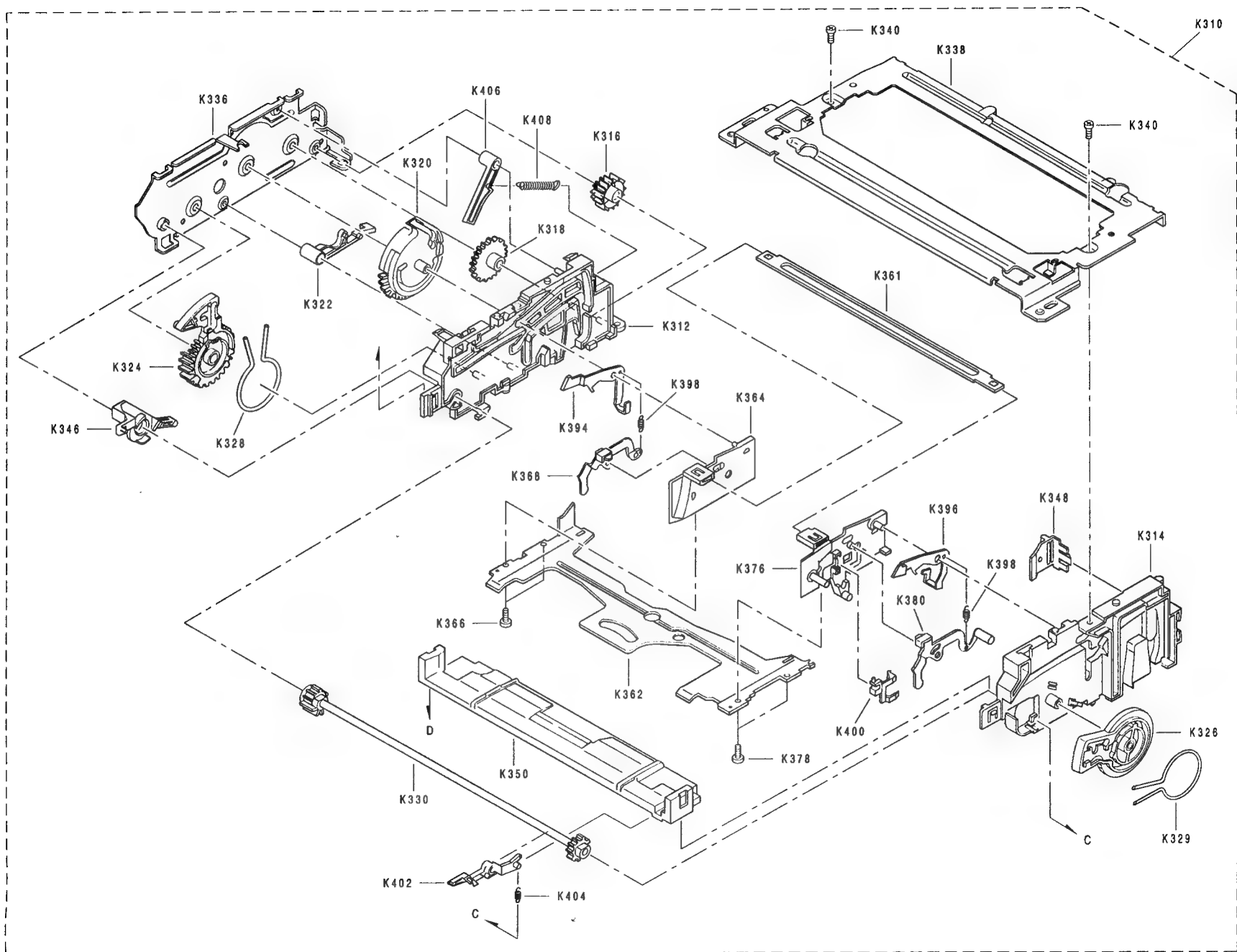
1-3. CABINET ASSEMBLY



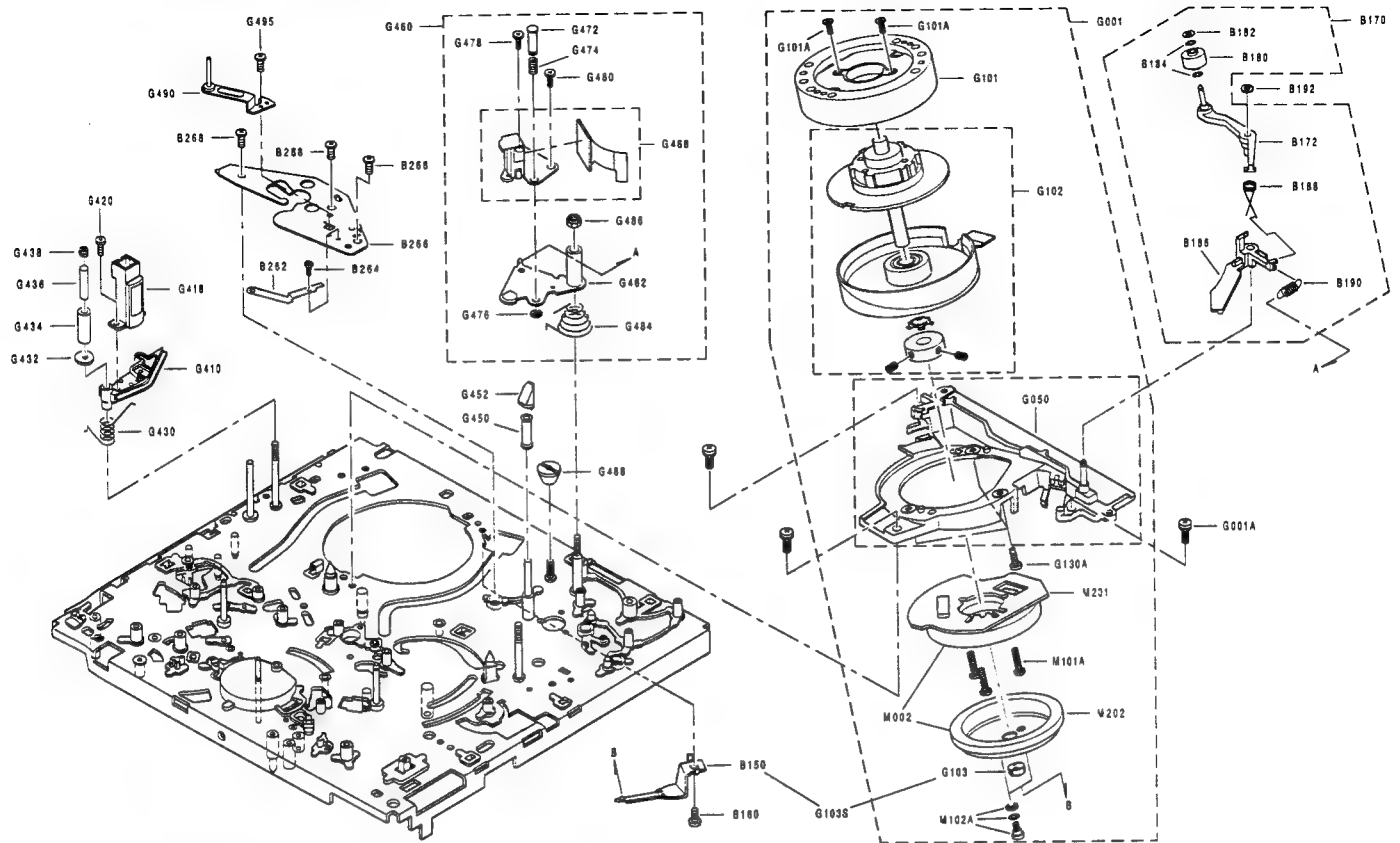
1-4. CHASSIS ASSEMBLY



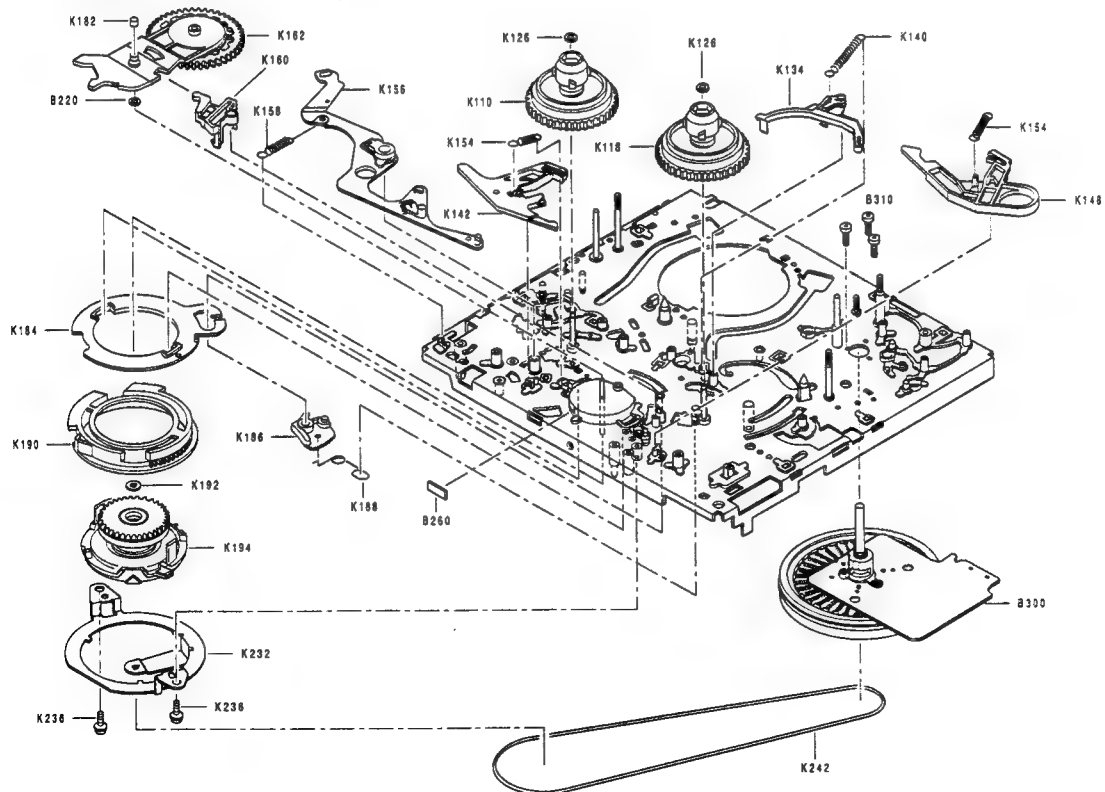
1-5. CASSETTE HOLDER ASSEMBLY



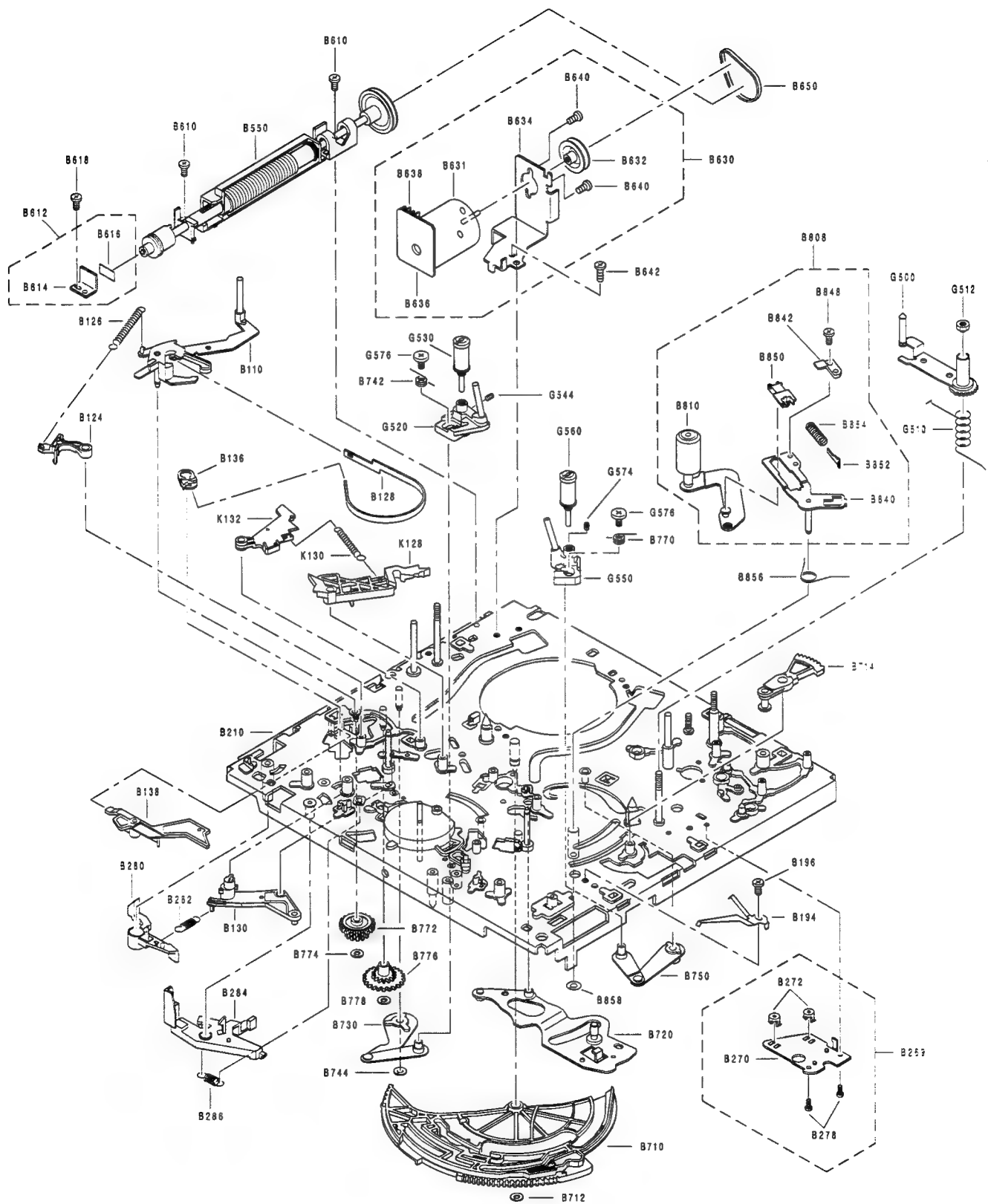
1-6. MECHANICAL PARTS (1)



1-7. MECHANICAL PARTS (2)



1-8. MECHANICAL PARTS (3)



2. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION	LOCATION NUMBER	PART NUMBER	DESCRIPTION
- MECHANICAL PARTS -			G103S	70903458	Ground Brush KIT
A101	70884267	Front Panel	G130A	70391409	Screw 2. 6x8mm
A101A	72471082	Screw, 3x10mm	G410	70363227	Lever
A102	70868589	Cassette Door	G418	70183017	FE Head
A102A	70356341	Spring	G420	70391024	Screw 2. 6x6mm
A104	70824384	Top Cover	G430	70356284	Spring
A104A	70391440	Screw 3x10mm	G432	70379607	Flange
A104B	70391818	Screw 3x8mm	G434	70348112	Guide Roller
A120	70815767	Bottom Cover	G436	70338211	Guide Sleeve
A701	70917767	Case	G438	70393030	Nut 2. 6x3mm
A702	70921516	Packing(Top)	G450	70379067	Guide Sleeve
A703	70921517	Packing(Bottom)	G452	70368169	Guide Cap
AT03	70108832	Case(Battery)	G460	70318587	ACE Head Base Assy
B110	70328424	Lever Assy	G462	70328425	ACE Main Base Sub Assy
B124	70363222	Lever	G468	70182093	ACE Head Sub Assy
B126	70356277	Spring	G472	70378601	Shaft
B128	70325540	Band Brake Assy	G474	70351665	Spring
B130	70325541	Lever Assy	G476	23002250	E-ring
B136	70368249	Band Holder	G478	23712308	Screw 3x0. 5x8mm
B138	70366171	Drive Mode Slider	G480	70391322	Adjust Screw
B150	70325542	Ground Brush Assy	G484	70356286	Spring
B160	70391345	Screw 3x3mm	G486	70393030	Nut 2. 6x3mm
B170	70326690	Lever Assy	G490	70320328	No. 10 Guide Assy
B180	70353164	Cleaner	G500	70320308	Lever Assy
B182	70396284	Washer 4. 0x1. 6x0. 35mm	G510	70356285	Spring
B184	70396048	Washer 3. 9x2. 1x0. 25mm	G512	70393044	Nut
B192	70396284	Washer 4. 0x1. 6x0. 35mm	G520	70322499	Slider Assy
B194	70352221	Spring	G530	70322500	Roller Assy
B196	70391345	Screw 3x3mm	G544	70391570	Screw 2x3mm
B264	23712203	Screw 2x3mm	G550	70322501	Slider Assy
B268	70391683	Screw 2. 6x6mm	G560	70322502	Roller Assy
B280	70363024	F/L Lever	G574	70391570	Screw 2x3mm
B282	70356265	Spring	G576	70391780	Screw
B284	70363025	Lever	K110	70326546	Reel Disk Assy
B286	70356266	Spring	K118	70326547	Reel Disk Assy
B300	70125660	Motor Assy	K126	70396191	Washer FI 2. 1x5x 0. 5mm
B310	23129584	Screw	K128	70363026	Lever
B550	70322485	Drive Shaft Assy	K130	70356275	Spring
B576	70338075	Bearing	K132	70363027	Lever
B578	70394153	Spacer	K134	70326548	Lever Assy
B584	70396057	Washer 5. 4x3. 1x0. 5mm	K140	70356271	Spring
B601B	70862380	Rubber	K142	70326549	Lever Assy
B610	70391683	Screw 2. 6x6mm	K148	70326550	Lever Assy
B612	70322488	Plate Assy	K154	70356272	Spring
B618	70391349	Screw 2. 6x3mm	K156	70363188	Lever Assy
B630	70322489	Motor Assy	K158	70356273	Spring
B642	70391685	Screw 3x4mm	K160	70363217	Lever
B650	70342111	Belt	K162	70326551	Idle Arm Assy
B710	70333433	Cam Gear	K182	70368241	Cap
B712	70396194	Washer 3. 1x6x0. 5mm	K188	70350036	Spring
B714	70322490	Lever Assy	K190	70333417	Clutch Cam
B719	70396170	Washer 2. 1x4x0. 35mm	K192	70394244	Washer
B720	70322491	Lever Assy	K194	70326589	Clutch Assy
B730	70322492	Link Assy	K232	70371912	Holder
B742	70356280	Spring	K236	23721004	Screw 2. 6x10mm
B744	70396171	Washer 2. 6x6x0. 35mm	K242	70342112	Reel Belt
B750	70322493	Link Assy	K310	70314349	Front Loading Assy
B770	70356281	Spring	K316	70333407	Gear
B772	70333422	Gear	K318	70333408	Gear
B774	70396170	Washer 2. 1x4x0. 35mm	K320	70333409	Gear
B776	70333425	Gear	K324	70333410	Arm Gear
B778	70396170	Washer 2. 1x4x0. 35mm	K326	70333411	Arm Gear
B808	70322504	Pinch Lever Assy	K330	70324864	Drive Shaft Assy
B848	70391407	Screw 2x0. 4x2mm	K340	70391354	Screw 3x6mm
B856	70356279	Spring	K346	70363232	Lever
B858	70396248	Washer 2. 6x5. 0x0. 5mm	K402	70363234	Lever
B898	70391081	Screw 4x12mm	K404	70356289	Spring
G001	70311802	Cylinder Assy	K410	23723308	Screw 3x8mm
G001A	23723308	Screw 3x8mm	M002	70903664	Cylinder Motor
G101	70325689	Upper Cylinder Assy	△P801	23176916	Power Cord 250V, 2. 5A
G101A	70391398	Screw 2. 6x8mm	U201A	70391334	Screw 3x8mm
G102	70325690	Lower Cylinder Assy	U501A	70391334	Screw 3x8mm
G103	70325494	Ground Cap Assy	VV01A	70391434	Screw 2. 6x6mm
			W101	70178965	Wire FFC, 10P, 80mm
			Y101	70971477	Owners Manual

LOCATION NUMBER	PART NUMBER	DESCRIPTION
Y104	70933070	Cover
Y105	23364494	ANT Cable, PAL
Y106	70148861	Remote Control Unit
ZT01	23153736	Resonator, CSB455EB20

LOCATION NUMBER	PART NUMBER	DESCRIPTION
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DIFFERENCE LIST

V203CZE

A701	70917781	Case
Y101	70971487	Owners Manual

V303CZ

A101	70884269	Front Panel
A102	70868591	Cassette Door
A701	70917768	Case
G001	70311799	Cylinder Assy
G101	70325685	Upper Cylinder Assy
G102	70325626	Lower Cylinder Assy
Y101	70971490	Owners Manual
Y106	70148862	Remote Control Unit

LOCATION NUMBER	PART NUMBER	DESCRIPTION
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- ELECTRICAL PARTS -

■ U201 70187877 P C Board Assy Video CTL

- INTEGRATED CIRCUITS -

IC201	B0385405	IC	TA1202N
IC202	B0589980	IC	TL8839P
IC471	70119487	IC	BA7025L

- TRANSISTORS -

Q101	A6335477	Transistor, Chip	2SC2712-Y
Q102	A6335477	Transistor, Chip	2SC2712-Y
Q103	23314319	Transistor, Chip	XN1212
Q106	A6541130	Transistor, Chip	2SA1162-Y
Q107	A6335477	Transistor, Chip	2SC2712-Y
Q112	A6541130	Transistor, Chip	2SA1162-Y
Q113	A6335477	Transistor, Chip	2SC2712-Y
Q116	A6541130	Transistor, Chip	2SA1162-Y
Q117	A6335477	Transistor, Chip	2SC2712-Y
Q118	A6335477	Transistor, Chip	2SC2712-Y
Q121	A6335477	Transistor, Chip	2SC2712-Y
Q122	A6014020	Transistor, Chip	RN2402
Q123	A6335477	Transistor, Chip	2SC2712-Y
Q124	A6004040	Transistor, Chip	RN1404
Q205	A6335477	Transistor, Chip	2SC2712-Y
Q206	A6541130	Transistor, Chip	2SA1162-Y
Q207	A6541130	Transistor, Chip	2SA1162-Y
Q208	A6004020	Transistor, Chip	RN1402
Q209	A6541130	Transistor, Chip	2SA1162-Y
Q210	A6541130	Transistor, Chip	2SA1162-Y
Q211	A6335477	Transistor, Chip	2SC2712-Y
Q212	A6361470	Transistor	2SC3422-Y
Q220	A6541130	Transistor, Chip	2SA1162-Y
Q221	A6004040	Transistor, Chip	RN1404
Q402	A6004040	Transistor, Chip	RN1404
Q408	A6014040	Transistor, Chip	RN2404
Q409	A6004040	Transistor, Chip	RN1404
Q410	A6004040	Transistor, Chip	RN1404
Q411	23314317	Transistor, Chip	XN6501
Q413	A6541130	Transistor, Chip	2SA1162-Y
Q414	A6335477	Transistor, Chip	2SC2712-Y

- DIODES -

D201	A7152750	Diode	1SS226
D202	A7151250	Diode, Chip	1SS193
D204	A7150650	Diode	1SS184
D205	A7238420	Diode, Zener	02CZ5. 1-Y
D402	A7150650	Diode	1SS184

- COILS -

L102	23289121	Coil, Peaking	TRF4121AF
L103	23238708	Coil, Peaking	TRF4330AJ
L104	23238705	Coil, Peaking	TRF4560AJ
L106	23238708	Coil, Peaking	TRF4330AJ
L107	23238710	Coil, Peaking	TRF4220AJ
L108	23238710	Coil, Peaking	TRF4220AJ
L109	23289471	Coil, Peaking	TRF4471AF
L110	23289681	Coil, Peaking	TRF4681AF
L111	23289221	Coil, Peaking	TRF4221AF
L201	23238705	Coil, Peaking	TRF4560AJ
L202	23238714	Coil, Peaking	TRF4100AJ
L203	23238562	Coil, Peaking	TRF4109AJ
L206	23289470	Coil, Peaking	TRF4470AF
L207	23238705	Coil, Peaking	TRF4560AJ
L209	23238712	Coil, Peaking	TRF4150AJ
L210	23289180	Coil, Peaking	TRF4180F
L403	23238704	Coil, Peaking	TRF4680AJ
L404	23289150	Coil, Peaking	TRF4150AF
L451	70272005	Coil, Variable	LAA02

- CAPACITORS -

C101	24092293	Cap, Chip	0. 1MF	Z 25V
C103	24781330	Cap, Chip	33PF	J 50V
C104	24814103	Cap, Chip	0. 01MF	Z 50V
C105	24794470	Cap, Electrolytic	47MF	M 16V
C106	24287103	Cap, Chip	0. 01MF	Z 50V
C107	24781511	Cap, Chip	510PF	J 50V
C109	24814103	Cap, Chip	0. 01MF	Z 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION
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C110	24201470	Cap, Electrolytic	47MF	M 6. 3V
C111	24781121	Cap, Chip	120PF	J 50V
C114	24814103	Cap, Chip	0. 01MF	Z 50V
C115	24781560	Cap, Chip	56PF	J 50V
C118	24781150	Cap, Chip	15PF	J 50V
C119	24781220	Cap, Chip	22PF	J 50V
C120	24781030	Cap, Chip	3PF	C 50V
C121	24781120	Cap, Chip	12PF	J 50V
C122	24781100	Cap, Chip	10PF	D 50V
C124	24781470	Cap, Chip	47PF	J 50V
C125	24814103	Cap, Chip	0. 01MF	Z 50V
C126	24814103	Cap, Chip	0. 01MF	Z 50V
C127	24539334	Cap, Plastic	0. 33MF	J 50V
C128	24781681	Cap, Chip	680PF	J 50V
C129	24781270	Cap, Chip	27PF	J 50V
C130	24201470	Cap, Electrolytic	47MF	M 6. 3V
C131	24814103	Cap, Chip	0. 01MF	Z 50V
C132	24781181	Cap, Chip	180PF	J 50V
C133	24287103	Cap, Chip	0. 01MF	Z 50V
C135	24814103	Cap, Chip	0. 01MF	Z 50V
C201	24203100	Cap, Electrolytic	10MF	M 16V
C202	24203100	Cap, Electrolytic	10MF	M 16V
C203	24814103	Cap, Chip	0. 01MF	Z 50V
C205	24781470	Cap, Chip	47PF	J 50V
C206	24781221	Cap, Chip	220PF	J 50V
C207	24203100	Cap, Electrolytic	10MF	M 16V
C208	24814103	Cap, Chip	0. 01MF	Z 50V
C209	24201101	Cap, Electrolytic	100MF	M 6. 3V
C210	24205479	Cap, Electrolytic	4. 7MF	M 35V
C211	24781511	Cap, Chip	510PF	J 50V
C213	24781300	Cap, Chip	30PF	J 50V
C214	24781560	Cap, Chip	56PF	J 50V
C215	24814103	Cap, Chip	0. 01MF	Z 50V
C216	24814103	Cap, Chip	0. 01MF	Z 50V
C217	24814103	Cap, Chip	0. 01MF	Z 50V
C218	24591104	Cap, Plastic	0. 1MF	J 50V
C219	24205479	Cap, Electrolytic	4. 7MF	M 35V
C220	24287103	Cap, Chip	0. 01MF	Z 50V
C221	24206010	Cap, Electrolytic	1MF	M 50V
C222	24206010	Cap, Electrolytic	1MF	M 50V
C223	24205479	Cap, Electrolytic	4. 7MF	M 35V
C224	24206010	Cap, Electrolytic	1MF	M 50V
C225	24201470	Cap, Electrolytic	47MF	M 6. 3V
C226	24814103	Cap, Chip	0. 01MF	Z 50V
C227	24781080	Cap, Chip	8PF	D 50V
C228	24781220	Cap, Chip	22PF	J 50V
C229	24781330	Cap, Chip	33PF	J 50V
C231	24792101	Cap, Electrolytic	100MF	M 6. 3V
C233	24206010	Cap, Electrolytic	1MF	M 50V
C234	24206478	Cap, Electrolytic	0. 47MF	M 50V
C235	24814103	Cap, Chip	0. 01MF	Z 50V
C236	24206010	Cap, Electrolytic	1MF	M 50V
C237	24203220	Cap, Electrolytic	22MF	M 16V
C238	24092293	Cap, Chip	0. 1MF	Z 25V
C239	24201470	Cap, Electrolytic	47MF	M 6. 3V
C240	24781560	Cap, Chip	56PF	J 50V
C241	24781391	Cap, Chip	390PF	J 50V
C242	24276360	Cap, Chip	36PF	J 50V
C245	24781150	Cap, Chip	15PF	J 50V
C248	24781330	Cap, Chip	33PF	J 50V
C249	24436430	Cap, Ceramic	43PF	J 50V
C401	24815223	Cap, Chip	0. 022MF	K 50V
C402	24205479	Cap, Electrolytic	4. 7MF	M 35V
C404	24591222	Cap, Plastic	2200PF	J 50V
C405	24206228	Cap, Electrolytic	0. 22MF	M 50V
C406	24205479	Cap, Electrolytic	4. 7MF	M 35V
C407	24781151	Cap, Chip	150PF	J 50V
C409	24092293	Cap, Chip	0. 1MF	Z 25V
C413	24206010	Cap, Electrolytic	1MF	M 50V
C414	24814103	Cap, Chip	0. 01MF	Z 50V
C415	24792101	Cap, Electrolytic	100MF	M 6. 3V
C417	24206010	Cap, Electrolytic	1MF	M 50V
C419	24781220	Cap, Chip	22PF	J 50V
C420	24591223	Cap, Plastic	0. 022MF	J 50V
C421	24814103	Cap, Chip	0. 01MF	Z 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C422	24092293	Cap, Chip	0. 1MF	Z 25V	R233	24871182	Res, Chip	1. 8K	J 1/8W
C423	24287103	Cap, Chip	0. 01MF	Z 50V	R234	24871681	Res, Chip	680	J 1/8W
C424	24781100	Cap, Chip	10PF	D 50V	R235	24871681	Res, Chip	680	J 1/8W
C426	24814103	Cap, Chip	0. 01MF	Z 50V	R237	24872471	Res, Chip	470	J 1/16W
C470	24287103	Cap, Chip	0. 01MF	Z 50V	R238	24872101	Res, Chip	100	J 1/16W
C471	24814103	Cap, Chip	0. 01MF	Z 50V	R239	24872101	Res, Chip	100	J 1/16W
C472	24591223	Cap, Plastic	0. 022MF	J 50V	R240	24872102	Res, Chip	1K	J 1/16W
C473	24202330	Cap, Electrolytic	33MF	M 10V	R241	24872121	Res, Chip	120	J 1/16W
C474	24202330	Cap, Electrolytic	33MF	M 10V	R242	24000576	Chip Jumper		
C475	24206478	Cap, Electrolytic	0. 47MF	M 50V	R243	24000576	Chip Jumper		
C476	24201470	Cap, Electrolytic	47MF	M 6. 3V	R244	24000576	Chip Jumper		
C477	24814103	Cap, Chip	0. 01MF	Z 50V	R246	24872332	Res, Chip	3. 3K	J 1/16W
C478	24851104	Cap, Ceramic	0. 1MF	K 25V	R249	24872102	Res, Chip	1K	J 1/16W
		- RESISTORS -			R251	24066057	Res, Variable	10K	0. 1W
R101	24872102	Res, Chip	1K	J 1/16W	R252	24066057	Res, Variable	10K	0. 1W
R103	24872102	Res, Chip	1K	J 1/16W	R255	24066054	Res, Variable	1K	0. 1W
R104	24872681	Res, Chip	680	J 1/16W	R256	24066057	Res, Variable	10K	0. 1W
R105	24872102	Res, Chip	1K	J 1/16W	R257	24066055	Res, Variable	2K	0. 1W
R106	24872681	Res, Chip	680	J 1/16W	R260	24000576	Chip Jumper		
R107	24872163	Res, Chip	16K	J 1/16W	R269	24000576	Chip Jumper		
R108	24872821	Res, Chip	820	J 1/16W	R271	24000824	Chip Jumper		
R110	24872471	Res, Chip	470	J 1/16W	R273	24000576	Chip Jumper		
R111	24872273	Res, Chip	27K	J 1/16W	R274	24000576	Chip Jumper		
R116	24872152	Res, Chip	1. 5K	J 1/16W	R275	24872473	Res, Chip	47K	J 1/16W
R117	24872152	Res, Chip	1. 5K	J 1/16W	R401	24872561	Res, Chip	560	J 1/16W
R119	24872821	Res, Chip	820	J 1/16W	R402	24872243	Res, Chip	24K	J 1/16W
R120	24872102	Res, Chip	1K	J 1/16W	R414	24872103	Res, Chip	10K	J 1/16W
R121	24872102	Res, Chip	1K	J 1/16W	R415	24872103	Res, Chip	10K	J 1/16W
R122	24872271	Res, Chip	270	J 1/16W	R416	24871102	Res, Chip	1K	J 1/8W
R123	24872561	Res, Chip	560	J 1/16W	R417	24871682	Res, Chip	6. 8K	J 1/8W
R124	24872821	Res, Chip	820	J 1/16W	R419	24000824	Chip Jumper		
R126	24872102	Res, Chip	1K	J 1/16W	R420	24871103	Res, Chip	10K	J 1/8W
R127	24872471	Res, Chip	470	J 1/16W	R421	24872271	Res, Chip	270	J 1/16W
R128	24872182	Res, Chip	1. 8K	J 1/16W	R422	24872102	Res, Chip	1K	J 1/16W
R129	24872222	Res, Chip	2. 2K	J 1/16W	R423	24872102	Res, Chip	1K	J 1/16W
R130	24872152	Res, Chip	1. 5K	J 1/16W	R424	24872561	Res, Chip	560	J 1/16W
R131	24872101	Res, Chip	100	J 1/16W	R426	24872183	Res, Chip	18K	J 1/16W
R132	24872102	Res, Chip	1K	J 1/16W	R427	24872822	Res, Chip	8. 2K	J 1/16W
R133	24872333	Res, Chip	33K	J 1/16W	R428	24872152	Res, Chip	1. 5K	J 1/16W
R134	24872331	Res, Chip	330	J 1/16W	R429	24872101	Res, Chip	100	J 1/16W
R135	24872103	Res, Chip	10K	J 1/16W	R451	24066054	Res, Variable	1K	0. 1W
R136	24872271	Res, Chip	270	J 1/16W	R460	24000824	Chip Jumper		
R139	24872302	Res, Chip	3K	J 1/16W	R461	24872102	Res, Chip	1K	J 1/16W
R140	24872472	Res, Chip	4. 7K	J 1/16W	R466	24872101	Res, Chip	100	J 1/16W
R141	24872102	Res, Chip	1K	J 1/16W	R469	24000576	Chip Jumper		
R143	24872222	Res, Chip	2. 2K	J 1/16W	R470	24871223	Res, Chip	22K	J 1/8W
R144	24872333	Res, Chip	33K	J 1/16W	R472	24872271	Res, Chip	270	J 1/16W
R160	24000576	Chip Jumper			R473	24872154	Res, Chip	150K	J 1/16W
R165	24872333	Res, Chip	33K	J 1/16W	R474	24872222	Res, Chip	2. 2K	J 1/16W
R166	24872472	Res, Chip	4. 7K	J 1/16W	R475	24872152	Res, Chip	1. 5K	J 1/16W
R202	24872152	Res, Chip	1. 5K	J 1/16W	R476	24872102	Res, Chip	1K	J 1/16W
R203	24872472	Res, Chip	4. 7K	J 1/16W	R477	24872102	Res, Chip	1K	J 1/16W
R204	24872122	Res, Chip	1. 2K	J 1/16W	R480	24872472	Res, Chip	4. 7K	J 1/16W
R205	24872152	Res, Chip	1. 5K	J 1/16W	R483	24872202	Res, Chip	2K	J 1/16W
R206	24872562	Res, Chip	5. 6K	J 1/16W	R484	24871102	Res, Chip	1K	J 1/8W
R207	24872822	Res, Chip	8. 2K	J 1/16W	R498	24000576	Chip Jumper		
R208	24872681	Res, Chip	680	J 1/16W			- MISCELLANEOUS -		
R210	24872102	Res, Chip	1K	J 1/16W	P202	23367424	Plug, 10P		
R211	24872102	Res, Chip	1K	J 1/16W	W101	70178509	Wire	FFC, 13P, 50mm	
R212	24872102	Res, Chip	1K	J 1/16W	W101A	23902364	Connector, FFC 13P		
R213	24872102	Res, Chip	1K	J 1/16W	X401	23153360	Crystal	4. 433619MHz	
R214	24872182	Res, Chip	1. 8K	J 1/16W	△Z202	23118368	IC Protector	ICP-N20	
R215	24872561	Res, Chip	560	J 1/16W	Z401	70138137	Delay Line, 2H Delay		
R216	24872332	Res, Chip	3. 3K	J 1/16W	Z471	23107980	Filter	4. 5MHz	
R217	24872103	Res, Chip	10K	J 1/16W					
R219	24872105	Res, Chip	1M	J 1/16W	■U601	70187876	P C Board Assy	Main	
R222	24871223	Res, Chip	22K	J 1/8W			- INTEGRATED CIRCUITS -		
R225	24871394	Res, Chip	390K	J 1/8W	IC501	70129417	IC	TMP90CK42DF-3806Z	
R226	24872222	Res, Chip	2. 2K	J 1/16W	IC503	B0384053	IC	TA8789AF	
R227	24872183	Res, Chip	18K	J 1/16W	IC601	B0320660	IC	TA7291P	
R228	24872822	Res, Chip	8. 2K	J 1/16W	IC602	70119743	IC	PST523D	
R229	24872681	Res, Chip	680	J 1/16W	IC701	70129343	IC	BA7795LS	
R230	24872152	Res, Chip	1. 5K	J 1/16W	△Q801	A8645130	IC	TL721	
R231	24872561	Res, Chip	560	J 1/16W	△Q802	A8645130	IC	TL721	
R232	24872102	Res, Chip	1K	J 1/16W	△IC803	70135622	IC	STRD6008Y	

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IC821	70135106	IC	STK5383	
IC823	23318653	IC	UPC1093J	
ICX04	70128046	IC	CAT93C46P	
ZI11	70128691	Photo Interrupter	TCST5123	
ZI12	70128691	Photo Interrupter	TCST5123	
ZI13	70128692	Photo Interrupter	TCST5133	
ZI14	70128692	Photo Interrupter	TCST5133	
- TRANSISTORS -				
Q001	A6335477	Transistor, Chip	2SC2712-Y	
Q060	A6004010	Transistor, Chip	RN1401	
Q361	A6548370	Transistor, Chip	2SA1362-GR	
Q517	A6004040	Transistor, Chip	RN1404	
Q610	A6541130	Transistor, Chip	2SA1162-Y	
Q611	A6004040	Transistor, Chip	RN1404	
Q681	A6533247	Transistor	2SA966-Y	
Q682	A6541130	Transistor, Chip	2SA1162-Y	
Q683	A6335477	Transistor, Chip	2SC2712-Y	
Q685	A6533247	Transistor	2SA966-Y	
Q686	A6541130	Transistor, Chip	2SA1162-Y	
Q702	A6004040	Transistor, Chip	RN1404	
Q703	A6004040	Transistor, Chip	RN1404	
Q771	A6319311	Transistor	2SC1959-Y	
Q773	A6004040	Transistor, Chip	RN1404	
Q822	23314141	Transistor	2SC3852	
Q101	70114403	Transistor, Photo	PT493F	
Q102	70114403	Transistor, Photo	PT493F	
QX06	A6004020	Transistor, Chip	RN1402	
QY01	A6534145	Transistor	2SA1020-Y	
QY02	A6004020	Transistor, Chip	RN1402	
- DIODES -				
D040	A7118235	Diode, Zener	04AZ33-R	
D361	A7152750	Diode	1SS226	
D503	23118041	Diode, Chip	MA111	
D504	23115537	Diode	1SS131	
D505	A7116925	Diode, Zener	04AZ9.1Z	
D601	23115537	Diode	1SS131	
D603	23115537	Diode	1SS131	
D701	23118041	Diode, Chip	MA111	
D802	23316645	Diode	ERA15-06	
△D803	23316711	Diode	SIWBA60	
D804	23316765	Diode	1SS136	
D805	23118056	Diode	AG01	
D806	23316765	Diode	1SS136	
△D821	23316766	Diode	RU2YX	
△D822	23316766	Diode	RU2YX	
D823	23316765	Diode	1SS136	
DI01	70115450	Diode, LED	GL451V	
DX04	23118041	Diode, Chip	MA111	
DY01	23118486	Diode	ERA15-02	
- COILS -				
L040	23289150	Coil, Peaking	TRF4150AF	
L060	23289220	Coil, Peaking	TRF4220AF	
L061	23289220	Coil, Peaking	TRF4220AF	
L501	70131060	Filter	ZBF253D-00F	
L503	70131060	Filter	ZBF253D-00F	
L701	23237729	Coil, Peaking	TRF4822AP	
L771	23289331	Coil, Peaking	TRF4331AF	
L821	70211045	Coil, Choke		
L822	70211045	Coil, Choke		
L823	23238653	Coil, Peaking	TRF4470AI	
- CAPACITORS -				
C040	24630023	Cap, Electrolytic	4.7MF	M 16V
C042	24090075	Cap, OS	4.7MF	M 16V
C043	24815103	Cap, Chip	0.01MF	K 50V
C044	24797101	Cap, Electrolytic	100MF	M 50V
C060	24793470	Cap, Electrolytic	47MF	M 10V
C061	24794470	Cap, Electrolytic	47MF	M 16V
C062	24794220	Cap, Electrolytic	22MF	M 16V
C063	24815103	Cap, Chip	0.01MF	K 50V
C067	24815103	Cap, Chip	0.01MF	K 50V
C361	24793471	Cap, Electrolytic	470MF	M 10V
C362	24630850	Cap, Electrolytic	47MF	M 16V
C363	24814103	Cap, Chip	0.01MF	Z 50V
C501	24630864	Cap, Electrolytic	100MF	M 6.3V
C504	24630019	Cap, Electrolytic	10MF	M 6.3V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C505	24774180	Cap, Chip	18PF	J 50V
C506	24774180	Cap, Chip	18PF	J 50V
C507	24781102	Cap, Chip	1000PF	J 50V
C508	24781102	Cap, Chip	1000PF	J 50V
C509	24815103	Cap, Chip	0.01MF	K 50V
C510	24815103	Cap, Chip	0.01MF	K 50V
C511	24630850	Cap, Electrolytic	47MF	M 16V
C513	24630025	Cap, Electrolytic	10MF	M 50V
C514	24815103	Cap, Chip	0.01MF	K 50V
C521	24630858	Cap, Electrolytic	47MF	M 10V
C522	24781181	Cap, Chip	180PF	J 50V
C524	24781181	Cap, Chip	180PF	J 50V
C527	24630034	Cap, Electrolytic	1MF	M 50V
C528	24630034	Cap, Electrolytic	1MF	M 50V
C529	24815103	Cap, Chip	0.01MF	K 50V
C530	24815103	Cap, Chip	0.01MF	K 50V
C532	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
C533	24630868	Cap, Electrolytic	22MF	M 6.3V
C534	24630866	Cap, Electrolytic	47MF	M 6.3V
C535	24815681	Cap, Chip	680PF	K 50V
C536	24781221	Cap, Chip	220PF	J 50V
C537	24630035	Cap, Electrolytic	2.2MF	M 50V
C538	24815103	Cap, Chip	0.01MF	K 50V
C539	24781221	Cap, Chip	220PF	J 50V
C540	24815222	Cap, Chip	2200PF	K 50V
C541	24815103	Cap, Chip	0.01MF	K 50V
C542	24815103	Cap, Chip	0.01MF	K 50V
C548	24815102	Cap, Chip	1000PF	K 50V
C601	24630843	Cap, Electrolytic	33MF	M 25V
C602	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
C607	24630034	Cap, Electrolytic	1MF	M 50V
C608	24814103	Cap, Chip	0.01MF	Z 50V
C681	24794470	Cap, Electrolytic	47MF	M 16V
C682	24794220	Cap, Electrolytic	22MF	M 16V
C701	24815561	Cap, Chip	560PF	K 50V
C703	24630840	Cap, Electrolytic	4.7MF	M 35V
C704	24815103	Cap, Chip	0.01MF	K 50V
C705	24203220	Cap, Electrolytic	22MF	M 16V
C706	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
C707	24203470	Cap, Electrolytic	47MF	M 16V
C708	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
C709	24285104	Cap, Chip	0.1MF	K 50V
C710	24630035	Cap, Electrolytic	2.2MF	M 50V
C712	24630034	Cap, Electrolytic	1MF	M 50V
C713	24591123	Cap, Plastic	0.012MF	J 50V
C714	24630852	Cap, Electrolytic	22MF	M 16V
C721	24815472	Cap, Chip	4700PF	K 50V
C771	24630850	Cap, Electrolytic	47MF	M 16V
C772	24285103	Cap, Chip	0.01MF	K 50V
C773	24285472	Cap, Chip	4700PF	K 50V
C774	24285103	Cap, Chip	0.01MF	K 50V
C775	24082049	Cap, Plastic	0.047MF	J 100V
△C801	24082318	Cap, Plastic	0.1MF	M 250V
△C802	24092453	Cap, Ceramic	220PF	K 400V
△C802A	70852507	Cover		
△C803	24092453	Cap, Ceramic	220PF	K 400V
△C803A	70852507	Cover		
△C804	24082318	Cap, Plastic	0.1MF	M 250V
△C805	24086044	Cap, Electrolytic	47MF	M 450V
△C806	24215101	Cap, Ceramic	100PF	K 1KV
C807	24538683	Cap, Plastic	0.068MF	J 50V
C808	24591682	Cap, Plastic	6800PF	J 50V
C809	24591472	Cap, Plastic	4700PF	J 50V
△C811	24094656	Cap, Ceramic	2200PF	M 400V
△C811A	70852507	Cover		
△C821	24617026	Cap, Electrolytic	820MF	M 16V
C822	24666221	Cap, Electrolytic	220MF	M 16V
△C823	24617012	Cap, Electrolytic	1000MF	M 10V
C824	24665101	Cap, Electrolytic	100MF	M 10V
C825	24617945	Cap, Electrolytic	220MF	M 10V
C826	24203220	Cap, Electrolytic	22MF	M 16V
C827	24203220	Cap, Electrolytic	22MF	M 16V
C828	24203220	Cap, Electrolytic	22MF	M 16V
C829	24793101	Cap, Electrolytic	100MF	M 10V
C830	24797220	Cap, Electrolytic	22MF	M 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C831	24797220	Cap, Electrolytic	22MF	M 50V
C832	24538224	Cap, Plastic	0.22MF	J 50V
C850	24591222	Cap, Plastic	2200PF	J 50V
CI01	24814103	Cap, Chip	0.01MF	Z 50V
CI02	24814103	Cap, Chip	0.01MF	Z 50V
CX07	24794100	Cap, Electrolytic	10MF	M 16V
CX09	24815103	Cap, Chip	0.01MF	K 50V
CX10	24815102	Cap, Chip	1000PF	K 50V
CY01	24630850	Cap, Electrolytic	47MF	M 16V
- RESISTORS -				
R001	24872102	Res, Chip	1K	J 1/16W
R002	24872472	Res, Chip	4.7K	J 1/16W
R030	24000824	Chip Jumper		
R040	24872101	Res, Chip	100	J 1/16W
R041	24872101	Res, Chip	100	J 1/16W
R042	24872101	Res, Chip	100	J 1/16W
R043	24872473	Res, Chip	47K	J 1/16W
R044	24871202	Res, Chip	2K	J 1/8W
R045	24871202	Res, Chip	2K	J 1/8W
R060	24000573	Res, Chip	1K	F 1/16W
R063	24000824	Chip Jumper		
R064	24000824	Chip Jumper		
R066	24000824	Chip Jumper		
R067	24871102	Res, Chip	1K	J 1/8W
R068	24000824	Chip Jumper		
R069	24000824	Chip Jumper		
R070	24000824	Chip Jumper		
R073	24000824	Chip Jumper		
R076	24000824	Chip Jumper		
R361	24872101	Res, Chip	100	J 1/16W
R362	24872112	Res, Chip	1.1K	J 1/16W
R363	24872112	Res, Chip	1.1K	J 1/16W
R364	24872112	Res, Chip	1.1K	J 1/16W
R365	24872112	Res, Chip	1.1K	J 1/16W
R366	24872750	Res, Chip	75	J 1/16W
R367	24872750	Res, Chip	75	J 1/16W
R368	24000824	Chip Jumper		
R369	24000576	Chip Jumper		
R501	24871102	Res, Chip	1K	J 1/8W
R507	24872473	Res, Chip	47K	J 1/16W
R508	24872473	Res, Chip	47K	J 1/16W
R509	24872114	Res, Chip	110K	J 1/16W
R510	24872114	Res, Chip	110K	J 1/16W
R511	24871222	Res, Chip	2.2K	J 1/8W
R512	24872472	Res, Chip	4.7K	J 1/16W
R513	24872472	Res, Chip	4.7K	J 1/16W
R516	24872222	Res, Chip	2.2K	J 1/16W
R517	24872912	Res, Chip	9.1K	J 1/16W
R518	24872103	Res, Chip	10K	J 1/16W
R519	24872163	Res, Chip	16K	J 1/16W
R521	24872473	Res, Chip	47K	J 1/16W
R522	24872563	Res, Chip	56K	J 1/16W
R523	24872182	Res, Chip	1.8K	J 1/16W
R524	24872563	Res, Chip	56K	J 1/16W
R525	24872182	Res, Chip	1.8K	J 1/16W
R532	24871513	Res, Chip	51K	J 1/8W
R533	24872183	Res, Chip	18K	J 1/16W
R535	24872513	Res, Chip	51K	J 1/16W
R536	24872621	Res, Chip	620	J 1/16W
R537	24872393	Res, Chip	39K	J 1/16W
R538	24872394	Res, Chip	390K	J 1/16W
R540	24871684	Res, Chip	680K	J 1/8W
R544	24366102	Res, Carbon	1K	J 1/6W
R560	24872101	Res, Chip	100	J 1/16W
R561	24872472	Res, Chip	4.7K	J 1/16W
R562	24871102	Res, Chip	1K	J 1/8W
R563	24872102	Res, Chip	1K	J 1/16W
R564	24872102	Res, Chip	1K	J 1/16W
R565	24366102	Res, Carbon	1K	J 1/6W
R566	24872102	Res, Chip	1K	J 1/16W
R580	24872472	Res, Chip	4.7K	J 1/16W
R591	24871222	Res, Chip	2.2K	J 1/8W
R601	24871222	Res, Chip	2.2K	J 1/8W
R602	24872512	Res, Chip	5.1K	J 1/16W
R603	24366133	Res, Carbon	13K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R604	24872103	Res, Chip	10K	J 1/16W
R605	24872473	Res, Chip	47K	J 1/16W
R606	24872102	Res, Chip	1K	J 1/16W
R607	24871102	Res, Chip	1K	J 1/8W
R608	24872472	Res, Chip	4.7K	J 1/16W
R611	24872222	Res, Chip	2.2K	J 1/16W
R613	24871102	Res, Chip	1K	J 1/8W
R614	24871103	Res, Chip	10K	J 1/8W
R615	24872103	Res, Chip	10K	J 1/16W
R616	24872102	Res, Chip	1K	J 1/16W
R622	24872103	Res, Chip	10K	J 1/16W
R625	24872103	Res, Chip	10K	J 1/16W
R626	24872103	Res, Chip	10K	J 1/16W
R628	24872472	Res, Chip	4.7K	J 1/16W
R632	24872472	Res, Chip	4.7K	J 1/16W
R633	24871472	Res, Chip	4.7K	J 1/8W
R635	24872472	Res, Chip	4.7K	J 1/16W
R636	24872472	Res, Chip	4.7K	J 1/16W
R661	24872102	Res, Chip	1K	J 1/16W
R663	24872102	Res, Chip	1K	J 1/16W
R664	24872102	Res, Chip	1K	J 1/16W
R665	24872102	Res, Chip	1K	J 1/16W
R667	24872102	Res, Chip	1K	J 1/16W
R670	24872473	Res, Chip	47K	J 1/16W
R671	24872102	Res, Chip	1K	J 1/16W
R674	24872472	Res, Chip	4.7K	J 1/16W
R679	24872182	Res, Chip	1.8K	J 1/16W
R680	24872472	Res, Chip	4.7K	J 1/16W
R681	24872103	Res, Chip	10K	J 1/16W
R682	24872103	Res, Chip	10K	J 1/16W
R683	24872272	Res, Chip	2.7K	J 1/16W
R684	24872621	Res, Chip	620	J 1/16W
R685	24872102	Res, Chip	1K	J 1/16W
R686	24871183	Res, Chip	18K	J 1/8W
R687	24872102	Res, Chip	1K	J 1/16W
R701	24872333	Res, Chip	33K	J 1/16W
R703	24872181	Res, Chip	180	J 1/16W
R704	24872334	Res, Chip	330K	J 1/16W
R705	24872133	Res, Chip	13K	J 1/16W
R706	24872562	Res, Chip	5.6K	J 1/16W
R707	24872332	Res, Chip	3.3K	J 1/16W
R708	24872822	Res, Chip	8.2K	J 1/16W
R709	24000824	Chip Jumper		
R710	24872273	Res, Chip	27K	J 1/16W
R711	24872273	Res, Chip	27K	J 1/16W
R712	24872331	Res, Chip	330	J 1/16W
R713	24872202	Res, Chip	2K	J 1/16W
R714	24872202	Res, Chip	2K	J 1/16W
R715	24871103	Res, Chip	10K	J 1/8W
R716	24871105	Res, Chip	1M	J 1/8W
R717	24871103	Res, Chip	10K	J 1/8W
R718	24872332	Res, Chip	3.3K	J 1/16W
R719	24872822	Res, Chip	8.2K	J 1/16W
R720	24872102	Res, Chip	1K	J 1/16W
R721	24872822	Res, Chip	8.2K	J 1/16W
R722	24872433	Res, Chip	43K	J 1/16W
R723	24872182	Res, Chip	1.8K	J 1/16W
R724	24872332	Res, Chip	3.3K	J 1/16W
R725	24872433	Res, Chip	43K	J 1/16W
R726	24872103	Res, Chip	10K	J 1/16W
R727	24872103	Res, Chip	10K	J 1/16W
R728	24872223	Res, Chip	22K	J 1/16W
R772	24871682	Res, Chip	6.8K	J 1/8W
R773	24872101	Res, Chip	100	J 1/16W
R774	24871629	Res, Chip	6.2	J 1/8W
R779	24871629	Res, Chip	6.2	J 1/8W
R802	24376753	Res, Carbon	75K	J 1/2W
R803	24366512	Res, Carbon	5.1K	J 1/6W
R804	24366511	Res, Carbon	510	J 1/6W
R805	24383621	Res, Oxide Metal	620	J 2W
R807	24553680	Res, Oxide Metal	68	J 1W
R808	24366151	Res, Carbon	150	J 1/6W
R809	24366472	Res, Carbon	4.7K	J 1/6W
△R810	24321568	Res, Oxide Metal	0.56	J 1/2W
R811	24007487	Res, Cement	2.2	J 2W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R812	24366202	Res, Carbon	2K	J 1/6W
R813	24376474	Res, Carbon	470K	J 1/2W
R821	24019158	Res, Chip	6.8K	F 1/8W
R822	24019144	Res, Chip	1.5K	F 1/8W
R823	24871331	Res, Chip	330	J 1/8W
R824	24871752	Res, Chip	7.5K	J 1/8W
R825	24871102	Res, Chip	1K	J 1/8W
RI01	24872303	Res, Chip	30K	J 1/16W
RI02	24872223	Res, Chip	22K	J 1/16W
RI03	24871241	Res, Chip	240	J 1/8W
RI06	24872222	Res, Chip	2.2K	J 1/16W
RI07	24872302	Res, Chip	3K	J 1/16W
RI08	24872182	Res, Chip	1.8K	J 1/16W
RI11	24872562	Res, Chip	5.6K	J 1/16W
RI12	24872562	Res, Chip	5.6K	J 1/16W
RI13	24872562	Res, Chip	5.6K	J 1/16W
RI14	24872562	Res, Chip	5.6K	J 1/16W
RI15	24871361	Res, Chip	360	J 1/8W
RI18	24871361	Res, Chip	360	J 1/8W
RX01	24872102	Res, Chip	1K	J 1/16W
RX06	24872474	Res, Chip	470K	J 1/16W
RX18	24872102	Res, Chip	1K	J 1/16W
RX19	24872102	Res, Chip	1K	J 1/16W
RX20	24872103	Res, Chip	10K	J 1/16W
RX21	24871103	Res, Chip	10K	J 1/8W
RX22	24871102	Res, Chip	1K	J 1/8W
RX61	24872102	Res, Chip	1K	J 1/16W
RX62	24872472	Res, Chip	4.7K	J 1/16W
RY01	24366103	Res, Carbon	10K	J 1/6W
RY02	24366202	Res, Carbon	2K	J 1/6W
RY03	24366202	Res, Carbon	2K	J 1/6W
RY05	24871102	Res, Chip	1K	J 1/8W
RY90	24000576	Chip Jumper		
RY92	24000824	Chip Jumper		
△F801	23144476	Fuse	250V, 2.5A	
△F801A	23165433	Fuse Holder		
H006	70121812	3 IN 1 Tuner	TMUE1-201A	
P790	23365759	Phono Jack	4P	
△P802	23164866	Plug	2P	
Q8228	70391355	Screw	3x8mm	
△RF826	24545109	Res, Fusible	1	J 1/4W
△RF827	24546279	Res, Fusible	2.7	J 1/2W
S001	23145325	Slide Switch	1C2P	
S002	23145325	Slide Switch	1C2P	
SI01	23344089	Push Switch, 1C1P		
SI02	23344089	Push Switch, 1C1P		
SL02	23344083	Push Switch	1C1P	
SL04	23344083	Push Switch	1C1P	
SL05	23344083	Push Switch	1C1P	
SL06	23344083	Push Switch	1C1P	
SL08	23344083	Push Switch	1C1P	
T771	23224350	Ciol	TLN1088D	
△T801	23211654	Line Filter	TRF3188	
△T802	70213209	Power Transformer	TPW3286AD	
VF01	70843738	Terminal Board		
VF01A	70391440	Screw	3x10mm	
W501	70175012	Wire	FFC, 18P, L70	
W501A	23902369	Connector, FFC 18P		
WI02	70178952	Wire	5P	
X501	23153364	Crystal		
△Z001	23118369	IC Protector	ICP-N15	
△Z601	23144450	IC Protector	125V, 2.0A	
△Z771	23118122	IC Protector, ICP-N5		
△Z811	23144480	IC Protector	PRF3150	
△Z812	23144480	IC Protector	PRF3150	
△Z821	23118132	IC Protector	ICP-N10	
Z822	23107555	DC-DC Converter		
ZR01	23120247	F.U.	IR-9102A-K	
■U501	70187882	P C Board Assy	Relay	
		- CAPACITORS -		
C512	24630843	Cap, Electrolytic	33MF	M 25V
C777	24214221	Cap, Ceramic	220PF	K 500V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
- RESISTORS -				
R748	24872100	Res, Chip	10	J 1/16W
R790	24871303	Res, Chip	30K	J 1/8W
R791	24872562	Res, Chip	5.6K	J 1/16W
R792	24872184	Res, Chip	180K	J 1/16W
- MISCELLANEOUS -				
P502	23902797	Socket	18P	
P503	23902766	Socket	10P, FPC	
P706	23901508	Socket	7P	
■UV01	70187881	P C Board Assy	Pre Amp	
		- INTEGRATED CIRCUITS -		
ICV01	70129393	IC	LA7375ST	
- TRANSISTORS -				
QV02	A6541130	Transistor, Chip	2SA1162-Y	
QV03	A6014020	Transistor, Chip	RN2402	
QV04	A6335477	Transistor, Chip	2SC2712-Y	
QV05	A6004040	Transistor, Chip	RN1404	
- COILS -				
LV01	23289330	Coil, Peaking	TRF4330AF	
LV02	23289100	Coil, Peaking	TRF4100AF	
LV03	23289331	Coil, Peaking	TRF4331AF	
LV04	23289101	Coil, Peaking	TRF4101AF	
LV05	23289330	Coil, Peaking	TRF4330AF	
- CAPACITORS -				
CV01	24815103	Cap, Chip	0.01MF	K 50V
CV02	24815103	Cap, Chip	0.01MF	K 50V
CV03	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
CV06	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
CV07	24781181	Cap, Chip	180PF	J 50V
CV08	24781151	Cap, Chip	150PF	J 50V
CV09	24781470	Cap, Chip	47PF	J 50V
CV10	24781120	Cap, Chip	12PF	J 50V
CV11	24815103	Cap, Chip	0.01MF	K 50V
CV12	24815103	Cap, Chip	0.01MF	K 50V
CV13	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
CV14	24630866	Cap, Electrolytic	47MF	M 6.3V
CV15	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
CV16	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
CV17	24630866	Cap, Electrolytic	47MF	M 6.3V
CV18	24285104	Cap, Chip	0.1MF	K 50V
CV19	24092178	Cap, Ceramic, Chip	0.1MF	K 25V
- RESISTORS -				
RV01	24872102	Res, Chip	1K	J 1/16W
RV02	24872682	Res, Chip	6.8K	J 1/16W
RV03	24872103	Res, Chip	10K	J 1/16W
RV04	24872102	Res, Chip	1K	J 1/16W
RV05	24000576	Chip Jumper		
RV06	24872272	Res, Chip	2.7K	J 1/16W
RV07	24872222	Res, Chip	2.2K	J 1/16W
RV08	24872682	Res, Chip	6.8K	J 1/16W
RV10	24872101	Res, Chip	100	J 1/16W
RV11	24872182	Res, Chip	1.8K	J 1/16W
RV12	24872680	Res, Chip	68	J 1/16W
RV13	24872101	Res, Chip	100	J 1/16W
RV14	24872222	Res, Chip	2.2K	J 1/16W
RV15	24872680	Res, Chip	68	J 1/16W
RV16	24872124	Res, Chip	120K	J 1/16W
RV17	24872223	Res, Chip	22K	J 1/16W
RV18	24872563	Res, Chip	56K	J 1/16W
RV19	24872223	Res, Chip	22K	J 1/16W
RV21	24872122	Res, Chip	1.2K	J 1/16W
RV22	24872332	Res, Chip	3.3K	J 1/16W
RV23	24872152	Res, Chip	1.5K	J 1/16W
RV24	24872182	Res, Chip	1.8K	J 1/16W
RV40	24000824	Chip Jumper		
- MISCELLANEOUS -				
PV01	23902790	Socket, 10P		
PV02	23902811	Connector	FPC13P	
■UX02	70187880	P C Board Assy	Timer Display	
		- INTEGRATED CIRCUITS -		
ICX03	70129387	IC	UPD16312	
- DIODES -				
DX18	23115537	Diode	1SS131	

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
DX19	23115537	Diode	1SS131
DX20	23115537	Diode	1SS131
DX23	23115537	Diode	1SS131
		- CAPACITORS -	
CX01	24630864	Cap, Electrolytic	100MF M 6.3V
CX13	24781101	Cap, Chip	100PF J 50V
CX14	24781101	Cap, Chip	100PF J 50V
CX15	24781101	Cap, Chip	100PF J 50V
		- RESISTORS -	
RX03	24872513	Res, Chip	51K J 1/16W
RX10	24872102	Res, Chip	1K J 1/16W
RX11	24872103	Res, Chip	10K J 1/16W
RX12	24872103	Res, Chip	10K J 1/16W
RX13	24872103	Res, Chip	10K J 1/16W
RX30	24872100	Res, Chip	10 J 1/16W
RX33	24872102	Res, Chip	1K J 1/16W
RX34	24872102	Res, Chip	1K J 1/16W
RX35	24872102	Res, Chip	1K J 1/16W
RX36	24872102	Res, Chip	1K J 1/16W
RX39	24872103	Res, Chip	10K J 1/16W
RX40	24872103	Res, Chip	10K J 1/16W
RX41	24871103	Res, Chip	10K J 1/8W
RX42	24871103	Res, Chip	10K J 1/8W
		- MISCELLANEOUS -	
GX01	70113067	FIP	6-BT-181GK
SL03	23145295	Push Switch	
SL10	23145295	Push Switch	
SL11	23145295	Push Switch	
SL12	23145295	Push Switch	
WX01	70179394	Wire	FFC, 15P, L=100
WX01A	23902366	Connector	FFC, 15P, 1.25mm

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		DIFFERENCE LIST	
	V303CZ		
UX02	70187921	P C Board Assy	Timer Display
UV01	70187922	P C Board Assy	Pre Amp
		- INTEGRATED CIRCUITS -	
ICV01	B0383063	IC	TA8676F
		- TRANSISTORS -	
QV11	A6335477	Transistor, Chip	2SC2712-Y
QV12	A6541130	Transistor, Chip	2SA1162-Y
QV13	A6541130	Transistor, Chip	2SA1162-Y
QV14	A6541130	Transistor, Chip	2SA1162-Y
QV15	A6541130	Transistor, Chip	2SA1162-Y
QV16	A6004040	Transistor, Chip	RN1404
QV17	A6004040	Transistor, Chip	RN1404
		- DIODES -	
DV01	A7150500	Diode	1SS181
DV02	A7150500	Diode	1SS181
DV03	A7152750	Diode	1SS226
		- COILS -	
LV06	23289271	Coil, Peaking	TRF4271AF
LV07	23289820	Coil, Peaking	TRF4820AF
LV08	23289330	Coil, Peaking	TRF4330AF
LV09	23289270	Coil, Peaking	TRF4270AF
LV10	23289330	Coil, Peaking	TRF4330AF
LV11	23289470	Coil, Peaking	TRF4470AF
LV12	23289100	Coil, Peaking	TRF4100AF
		- CAPACITORS -	
CV01	24781820	Cap, Chip	82PF J 50V
CV02	24630034	Cap, Electrolytic	1MF M 50V
CV03	24815103	Cap, Chip	0.01MF K 50V
CV06	24815102	Cap, Chip	1000PF K 50V
CV07	24781050	Cap, Chip	5PF C 50V
CV08	24815103	Cap, Chip	0.01MF K 50V
CV09	24630034	Cap, Electrolytic	1MF M 50V
CV11	24630034	Cap, Electrolytic	1MF M 50V
CV12	24781820	Cap, Chip	82PF J 50V
CV13	24285103	Cap, Chip	0.01MF K 50V
CV14	24781100	Cap, Chip	10PF D 50V
CV16	24815102	Cap, Chip	1000PF K 50V
CV18	24815103	Cap, Chip	0.01MF K 50V
CV19	24630034	Cap, Electrolytic	1MF M 50V
CV20	24781101	Cap, Chip	100PF J 50V
CV21	24092178	Cap, Ceramic, Chip	0.1MF K 25V
CV22	24630852	Cap, Electrolytic	22MF M 16V
CV23	24815103	Cap, Chip	0.01MF K 50V
CV24	24815103	Cap, Chip	0.01MF K 50V
CV25	24092178	Cap, Ceramic, Chip	0.1MF K 25V
CV27	24285103	Cap, Chip	0.01MF K 50V
CV28	24781181	Cap, Chip	180PF J 50V
CV32	24815103	Cap, Chip	0.01MF K 50V
CV33	24630850	Cap, Electrolytic	47MF M 16V
CV34	24092178	Cap, Ceramic, Chip	0.1MF K 25V
CV38	24781620	Cap, Chip	62PF J 50V
CV39	24092178	Cap, Ceramic, Chip	0.1MF K 25V
CV40	24630866	Cap, Electrolytic	47MF M 6.3V
CV41	24092178	Cap, Ceramic, Chip	0.1MF K 25V
CV42	24092178	Cap, Ceramic, Chip	0.1MF K 25V
CV43	24630866	Cap, Electrolytic	47MF M 6.3V
CV44	24092178	Cap, Ceramic, Chip	0.1MF K 25V
CV45	24781050	Cap, Chip	5PF C 50V
CV47	24781151	Cap, Chip	150PF J 50V
CV48	24781620	Cap, Chip	62PF J 50V
CV49	24781080	Cap, Chip	8PF D 50V
		- RESISTORS -	
RV01	24872151	Res, Chip	150 J 1/16W
RV04	24872331	Res, Chip	330 J 1/16W
RV05	24872201	Res, Chip	200 J 1/16W
RV06	24872151	Res, Chip	150 J 1/16W
RV09	24872331	Res, Chip	330 J 1/16W
RV10	24872101	Res, Chip	100 J 1/16W
RV11	24872472	Res, Chip	4.7K J 1/16W
RV12	24872472	Res, Chip	4.7K J 1/16W
RV13	24872472	Res, Chip	4.7K J 1/16W
RV15	24872562	Res, Chip	5.6K J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RV16	24872332	Res, Chip	3. 3K	J 1/16W
RV17	24872102	Res, Chip	1K	J 1/16W
RV18	24872102	Res, Chip	1K	J 1/16W
RV19	24872682	Res, Chip	6. 8K	J 1/16W
RV20	24872123	Res, Chip	12K	J 1/16W
RV21	24872102	Res, Chip	1K	J 1/16W
RV22	24872102	Res, Chip	1K	J 1/16W
RV23	24872102	Res, Chip	1K	J 1/16W
RV24	24872222	Res, Chip	2. 2K	J 1/16W
RV25	24872472	Res, Chip	4. 7K	J 1/16W
RV26	24872122	Res, Chip	1. 2K	J 1/16W
RV27	24872103	Res, Chip	10K	J 1/16W
RV28	24872270	Res, Chip	27	J 1/16W
RV29	24872153	Res, Chip	15K	J 1/16W
RV30	24871183	Res, Chip	18K	J 1/8W
RV31	24872152	Res, Chip	1. 5K	J 1/16W
RV32	24872105	Res, Chip	1M	J 1/16W
RV33	24872101	Res, Chip	100	J 1/16W
RV34	24872102	Res, Chip	1K	J 1/16W
RV35	24871680	Res, Chip	68K	J 1/8W
RV36	24872101	Res, Chip	100	J 1/16W
RV37	24872102	Res, Chip	1K	J 1/16W
RV38	24871680	Res, Chip	68K	J 1/8W
RV39	24871393	Res, Chip	39K	J 1/8W
RV96	24000824	Chip Jumper		
RV97	24000576	Chip Jumper		
RV98	24000576	Chip Jumper		
RV99	24000576	Chip Jumper		
		- MISCELLANEOUS -		
PV01	23902790	Socket, 10P		
PV02	23902811	Connector	FPC13P	
■U501	70187923	P C Board Assy	Relay	
■U601	70187919	P C Board Assy	Main	
		- CAPACITORS -		
C702	24815332	Cap, Chip	3300PF	K 50V
C711	24591273	Cap, Plastic	0. 027MF	J 50V
		- RESISTORS -		
R662	24872102	Res, Chip	1K	J 1/16W
R670	24872103	Res, Chip	10K	J 1/16W
R702	24872272	Res, Chip	2. 7K	J 1/16W
		- MISCELLANEOUS -		
△Z301	23118122	IC Protector, ICP-N5		
■U201	70187920	P C Board Assy	Video CTL	
		- TRANSISTORS -		
Q110	A6004040	Transistor, Chip	RN1404	
Q115	A6004040	Transistor, Chip	RN1404	
Q118	-----	Not Used		
Q204	A6004040	Transistor, Chip	RN1404	
		- COILS -		
L105	23238709	Coil, Peaking	TRF4270AJ	
		- CAPACITORS -		
C102	24814103	Cap, Chip	0. 01MF	Z 50V
C117	24781390	Cap, Chip	39PF	J 50V
C129	24781101	Cap, Chip	100PF	J 50V
C135	24815102	Cap, Chip	1000PF	K 50V
C212	24781470	Cap, Chip	47PF	J 50V
		- RESISTORS -		
R102	24872123	Res, Chip	12K	J 1/16W
R106	24872561	Res, Chip	560	J 1/16W
R109	24871102	Res, Chip	1K	J 1/8W
R125	24872561	Res, Chip	560	J 1/16W
R133	-----	Not Used		
R134	-----	Not Used		
R135	-----	Not Used		
R136	-----	Not Used		
R138	24872122	Res, Chip	1. 2K	J 1/16W
R140	24872152	Res, Chip	1. 5K	J 1/16W
R143	24872472	Res, Chip	4. 7K	J 1/16W
R145	24872682	Res, Chip	6. 8K	J 1/16W
R209	24872102	Res, Chip	1K	J 1/16W
R218	24872103	Res, Chip	10K	J 1/16W
R460	-----	Not Used		

LOCATION NUMBER	PART NUMBER	DESCRIPTION
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